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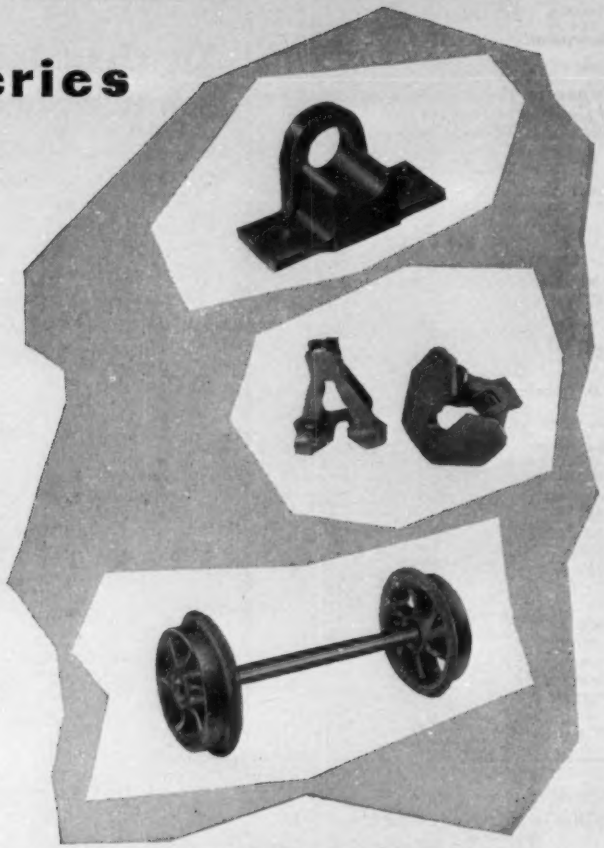
Steel Castings

For Collieries



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IRON AND COAL
TRADES REVIEW

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Clean Air

THE "Clean Air Year Book, 1960," is a publication upon which the National Society for Clean Air is to be congratulated. In addition to facts and figures relating to the society itself, it contains a wealth of information on a variety of subjects, ranging from the execution in 1306 of an offender for using sea-coal to the statistics of the "smog" of 1956. It is a document worthy of study by all interested in the problem of clean air.

Among the features which are of particular value, the reader will find a very concise outline of the Clean Air Act and a summary of both the Clean Air Regulations and the Dark Smoke Regulations, together with lists of the names of those local authorities which have made Smoke Control Areas. The lists are complete to January 31, 1960, and are given under three separate headings: (1) Smoke Control Areas in operation, (2) Orders confirmed but not yet in operation, (3) Smokeless zones under local Acts.

The acreage for each authority is given, and the total for the whole country is shown to be 33,691 acres, of which Orders in operation and smokeless zones under local Acts account for 17,290 acres. No figures are given for Orders under active consideration, in respect of which the acreage must be very considerable.

A chronological table of the history of air pollution in Great Britain from 1273 to 1959 is included, and it is recorded that in 1273 the use of coal was prohibited in London as being "prejudicial to health."

There is a table, prepared by Dr. A. Parker, which sets out the estimated pollution from the main uses of fuel in Great Britain in 1958 which is, in the main, in accord with the figures for 1953 contained in the report of the Beaver Committee. One difference, however, is a little surprising. The former director of the Fuel Research Station estimates a greater emission of smoke from coal used for domestic purposes on a somewhat lower consumption of coal.

The work of the society is set out very fully in geographical sections and the Diamond Jubilee International Conference and Exhibition is reported upon.

It is obvious that the annual report of a society of this nature is bound to contain statements that coal traders find very unpalatable, and in particular the statement: "Serious concern is also felt at an organized publicity and pressure campaign to obstruct the implementation of the Clean Air Act under guise of demands that smoke control areas should not be set up in districts deemed (presumably by the coal merchants) not to require cleaner air."

The writer goes on to say: "This reactionary attitude, we are glad to note, is not shared by all sections of the trade." And after further taking the trade to task, concludes the paragraph by saying: "It should be emphasized that the drive for clean air is not a drive against coal, but simply for its use in newer, cleaner, and more efficient ways."

This is a reflection of an opinion too widely held, that the coal trade is opposed to clean air, whereas the fact is that coal producers and coal merchants, equally with others, welcome the prospect of a cleaner atmosphere. If, on occasion, they appear to be militant, it is because they can be likened to the docile animal at the zoo whose cage carries the notice: "This animal is dangerous: when attacked it defends itself."

At times coal traders certainly have gained the impression that the motives behind some of the chief protagonists of Smoke Control Areas are directed more towards attacking coal than attacking air pollution. They would probably be a little less vigorous in their reaction if they could see a little more evidence of the truth of the statement that "the drive for clean air is not a drive against coal."

They are aware that over 70 per cent. of the "sustaining members" of the National Society for Clean Air (*i.e.*, members who make an annual contribution of £100 or more) are directly interested in competing with coal as a domestic fuel, and at the same time they consistently hear attacks being launched against domestic smoke on the alleged grounds that it is responsible for 50 per cent. of the atmospheric pollution. This is, of course, nonsense, as is shown by the figures on p. 7 of the Beaver report, and, again, on p.27 of the year book under review. At the same time they hear of practically no corresponding statements from the same sources attacking the far greater pollution arising from sulphur acids. In this connection it is not without interest to note that sulphur dioxide accounted for over 60 per cent. of the total air pollution resulting from fuel consumption in 1953 (Beaver Report, p. 7) and for over 64 per cent. in 1958 (Clean Air Year Book, 1960, p. 27).

The significance of these figures is apparent when they are studied in the light of paragraph 48 of the Beaver report, where the following statement occurs: "One of the most deleterious products of

the combustion of fuels is sulphur, present in the form of its oxides, mainly sulphur dioxide. Sulphur dioxide is discharged into the atmosphere with the chimney gases wherever fuel in the form of coal, coke, fuel oil, or unpurified gases is burnt. The degree of efficiency of combustion does not affect the quantity of sulphur dioxide evolved. A relatively small proportion of the sulphur contained in solid fuels is retained in the ashes, but the bulk goes into the atmosphere.

Coal and coke commonly contain between 1 per cent. and 2 per cent. of sulphur, and the position is likely to get worse since the average sulphur content of coals mined in Britain is steadily rising. Fuel oil frequently contains between 3 per cent. and 4 per cent. of sulphur."

It is perhaps understandable that coal merchants sometimes have a feeling of resentment at the coal trade, and particularly the domestic coal trade, being apparently singled out for attack, and that their resentment manifests itself in action which may appear to some to be unnecessarily militant.

We feel that it is so much in the public interest that members of the coal industry and trade should play the part that most of them would certainly wish to play in implementing the Clean Air Act that no effort should be spared to convince them by action—and not merely by words—that "the drive for clean air is not a drive against coal."

Miners Waved Lamps to Warn of Roof Fall

AFTER hearing creaking noises, miners working at the face in Elemore Colliery (Co. Durham) waved their lamps to warn an approaching colleague, but the roof collapsed and buried him, an Easington Lane inquest was told on Tuesday. Recording a verdict that Mr. Robert Hope (29) was accidentally killed by a roof fall, the Coroner, Mr. T. V. Devey, praised rescue workers for "their unstinting efforts under the most difficult conditions."

Mr. John Gulliver said that after he heard the creaking he sent out a message for the conveyor belt to stop so that the men could hear what was happening. "Then we saw the light of someone approaching. We waved our lamps. But just then the roof collapsed," he said. Rescue operations took more than 20 hours in a 27-in. high seam.

NATIONAL ASSOCIATION OF COLLIERY MANAGERS

The London office of the National Association of Colliery Managers will be closed from this evening (Friday) until Tuesday morning, June 7, covering the period of the association's annual conference and the Whitsun holiday.

Urgent correspondence timed to arrive up to next Friday morning should be addressed to the hon. secretary at the Palace Hotel, Southport (Lancs).

Passing Thoughts . . .

I THINK it is a great deal easier to be a critic than a selector. It is easier to be a selector than a designer and I think, although I have no experience, easier to be a designer than an enlightened and discriminating manufacturer.—DUKE OF EDINBURGH presenting certificates to manufacturers whose products have gained Design Centre awards.

It is contended here [Paris] that a greater obstacle to British exports than the Common Market's outside tariff is the reluctance of the Englishman to adapt his methods to modern French ways. If trade literature sent here is in English the chances are it will go straight into the wastepaper basket.—GEOFFREY MYERS *writing in the Daily Telegraph.*

No doubt we can well learn from the Germans the virtues of hard work and industrial self discipline; but to suggest that the industrial society which has led, and still leads, the world in so many engineering fields must ape its competitors in every fashion, even those which may contribute to some of our rivals' difficulties and social defects, seems somewhat unreasonable.—MR. K. L. STRETCH, recently appointed vice-principal of the College of Advanced Technology, Birmingham, in a letter to The Times.

Industry has its glamorous spots; it is not a dull dreary process to grind the life and soul out of those who enter it.—SIR ALEXANDER FLECK, *former chairman of Imperial Chemical Industries, Limited.*

Because a few nitwits in Chelsea like to draw attention to themselves by indulging in adolescent stamping in puddles, I am not prepared to believe that all young people hanker after the same dubious way of life. When I look at the fine type of youngster coming into the Association [of Supervising Electrical Engineers] as a graduate I have no fear as to the kind of men who in years to come will be sitting in our seats at this conference.—MR. CHARLES G. ALDRIDGE, chairman of the association at its annual conference.

You will probably have to pay more attention to your executive's instructions on strikes in the future than you have in the past.—MR. TED HILL, *general secretary of the Boilermakers' Society.*

If Members of Parliament are under a misapprehension about the South Wales coalfield, how much more so is the public? The picture in recent times has not inspired confidence. Pit closures and a drooping market for coal, added to intense and mounting competition from other fuels have bred suspicion in the public's mind and a sense of insecurity in the hearts of those most closely connected with the industry.—Western Mail.

A top-level salesman is something the coal industry needs desperately badly, and after 20 years of sellers' market conditions there are very few experienced salesmen in it.—*"Observer" in the Financial Times.*

We should consider whether 100 m.p.h. trains should not be like cars with light, low-slung coaches running of pneumatic wheels with an electric motor driving every wheel. In this space age we cannot cling to Victorian concepts and materials.—MR. R. GRESHAM COOKE, M.P., speaking at Harrogate.

There is nothing wrong with stainless steel cutlery today, but it requires sharpening every now and then.—MR. P. J. C. BOVILL, *Master Cutler, in a letter to The Times.*

FIRTH CLEVELAND PURCHASE

J. J. Habershon Bought from ISHRA

WHOLE of the issued share capital of J. J. Habershon & Sons, Limited, steel rollers, etc., of Rotherham, has been bought from the Iron and Steel Holding and Realisation Agency by Firth Cleveland, Limited, for £700,000. Firth Cleveland has also paid £100,000 of a £400,000 loan owed by Habershons to ISHRA and will pay the balance before October 1, next year. The transaction has been financed from Firth Cleveland's own resources.

Mr. John W. Tonking, managing director of Firth Cleveland Steel Strip, Limited, and of its subsidiary Tenuous Steel Company, Limited, has been appointed deputy chairman of Habershons and will be mainly responsible for the development of Firth Cleveland strip interests with Habershons. At a Press conference on Wednesday, Mr. Tonking described the acquisition as part of the logical development of the very successful activities of the Firth Cleveland group.

"An extensive examination of this company showed that its activities were complementary to those of Firth Cleveland Steel Strip, Limited," he said, "and that by the full exploitation of the combined forces of the two companies, we could cater for existing customers of both companies and for future expansion without the need for a major expansion programme at Firth Cleveland Steel Strip, with all the disruption of present production, alterations to buildings, long delay, and heavy capital expenditure."

When Habershons was nationalized, £609,038 was then paid for the company. The book value of its share capital and reserves on October 3, 1959, totalled £998,317, excluding the £400,000 loan.

Martin-Black Increased Sales and Production

WITH overall demand for high tensile steel wire still increasing above the high levels of 1959, sales and production figures of Martin-Black, Limited, Coatbridge, near Glasgow, are now well ahead of the corresponding figures at mid-May 1959 and are also ahead of the average for 1959 as a whole, states the chairman, Mr. James R. Hendry. Although home trade demand for wire rope is, as expected, still falling off and is below the 1959 level, export demand is now higher than it has been for a long time.

Against this, some part of the increased export business in wire rope is being taken at marginal levels and a wage increase has been granted to works employees without increasing prices. The raw material position is being safeguarded by importing wire rods at prices above UK levels, so profit margins are likely to be reduced.

Mr. Hendry expects 1960 profits to be at least as satisfactory as those for 1959 and it is expected to pay a 15 per cent. dividend for the year compared with the 12½ per cent. forecast last September.

Prices a Big Factor for BICC Prospects

MAIN problem for British Insulated Callender's Cables, Limited, in 1960, will be the prices at which goods are sold, particularly low-voltage mains and wiring and general cables, said the chairman, Mr. W. H. McFadzean, in his annual statement. He believes there will be plenty of business available and the company would certainly endeavour to take its full share, he said.

Referring to the major re-orientation of trade arrangements in 1959 for the home market in the cable industry, Mr. McFadzean said: "We in BICC have given a lead to the industry by raising prices to some extent, although these have by no means brought us back to overall ecomonic levels." The achievement of this must remain one of the objectives and there were encouraging signs that other companies were thinking similarly, he declared.

Mr. McFadzean went on: "To my mind the most important single factor is whether the self-discipline which several companies have imposed will be sustained. It is too early to be definite, but I think there are good hopes that it will. If it is, then 1960, while not producing satisfactory results in this range of our products, may prove a very important year in that it may witness stability being reintroduced into the cablemaking industry on which a more economic future can be built."

Group sales rose from £110,000,000 to £128,000,000 in 1959, of which £38,000,000 represented exports from the UK and sales of oversea companies. Group net profit increased from £3,292,989 to £4,231,569 and the dividend is 13½ per cent. (same on smaller capital).

Expansion of Australian Steel Industry

PLANS for a big expansion of the Australian steel industry were announced on Tuesday by the general manager of Broken Hill Proprietary Company, Limited, Mr. I. McLennan. He said that expansion over the next 10 years would include a new structural steel mill at Whyalla, South Australia, which would cost £A11,000,000.

Mr. McLellan went on to say that the company was also to build a new rod mill at Newcastle, New South Wales, costing £A18,000,000. Broken Hill would install at both Whyalla and Newcastle the recently developed process of steel production known as the LD oxygen process.

Other Fuels Threat to Durham Coal

STRESSING that Durham's coal trade depended on the demands of the south of England gas industry, Mr. John C. George, Parliamentary Secretary to the Ministry of Power, warned during his visit to the Durham coalfield last week that competition for this market was likely to come from other forms of fuel suitable for gas making, notably methane.

MR. J. C. GEORGE

Emphasizing that Durham's future depended on its ability to meet this competition, Mr. George reminded a Press conference that the gas industry took more than 5,000,000 tons of Durham coal a year—about a quarter of its annual output. The Durham Divisional Coal Board, he said, was marshalling all its resources to retain its trade in this market. He added that it would be too much to say that coal industry prospects were much brighter than a year ago, but they were obviously better as stocks were being lifted.

The divisional chairman, Dr. William Reid, reported that so far this year, 300,000 tons had been taken from Durham's stockpile of 4,000,000 tons and more would be taken in the next six months to meet the extra demand from the steel industry. Exports, he said, were slightly up, and home demand was better than last summer. Costs were falling, too, because of increased productivity.

During his tour, Mr. George visited the Hawthorn combined mine at Murton, the biggest reorganization scheme in the division. His visit, he said, was to learn something about the excellent labour relations in the division and the spectacular reduction in the mining accident rate.

Pumps Begin to Drain Allerdean Drift

WORK started last week on the draining of Allerdean Drift mine (Northumberland) which has been flooded for more than 30 years. It is to be reopened under special licence from the National Coal Board to provide work for some of the 200 miners thrown idle when the nearby Blackhill Colliery was closed.

The board originally granted a licence to work the drift to Mr. G. Drummond, a local miners' secretary, but the raising of the money to prepare the pit led to difficulties and the licence was eventually transferred to the Elsdon Colliery Company, Limited, which is now carrying out pumping operations. Extra surface workers are being engaged to clear the pithead before the first miners go into the drift.

MORE THAN 20 PEOPLE were injured in further clashes between police and mineworkers on strike in the Miike coalfields on the Japanese island of Kyushu.

Scotland's Smokeless Fuel Problem

SPEAKING at the annual conference of the Scottish division of the National Society for Clean Air on Thursday of last week, the president, Mr. John Innes, urged the production of improved smokeless fuels to help in the fight against pollution from domestic smoke. He doubted if it was fully appreciated how much difficulty had been experienced by Scottish local authorities in trying to "sell" the idea of burning gasworks coke in open grates.

Ordinary gasworks coke was not acceptable to the average Scottish housewife and something better must be produced in quantity and be readily available at a reasonable price before they could hope to deal with the domestic smoke problem.

He believed supplies of a more reactive fuel were available in the west of Scotland but, although production was being expanded, he doubted whether they would be sufficient even for the needs of the west of Scotland, let alone for the whole of Scotland. There was an inkling that it might be augmented by new fuels from the National Coal Board, possibly to be produced within the next three years, and there was a hope that one manufacturing plant of size would be introduced in Scotland.

Mr. Alexander Steele, Edinburgh's city architect, said that millions of pounds were wasted by laying both gas and electricity mains so that the public could have freedom of fuel choice. Architects would be grateful if the Government formulated a fuel policy, he said.

SHAFT REPAIRS HALT PIT PRODUCTION

REPAIRS to the collapsed No. 2 shaft at Kinglassie Colliery (Fife) have taken longer than expected and all underground work has been stopped until a 200-yds. road has been driven from the surface mine at the colliery to the pit. This, together with No. 1 shaft, will provide the two exits required under the Coal Mines Act.

Even though round-the-clock shifts are working on the new underground road, it will not be ready for several weeks yet. The miners at the pit have been found work at the pithead and in the surface mine there, or on salvage work at the nearby Lady Helen Colliery.

The Scottish Divisional Coal Board's mobile emergency winding gear from Coatbridge (Lanarkshire) has been taken to the pit to enable shaftsmen to carry out repairs.

Death Fall into Coal Hopper

SURFACE worker at Wellesley Colliery (Fife) left his place of employment in the middle of a nightshift and fell 50 ft. to his death to the bottom of a giant hopper inside a new 1,000-ton bunker, it was stated at a Kirkcaldy inquest on Thursday of last week. The jury returned a formal verdict on the man, Mr. Thomas Brown Hamilton (43).

The colliery manager, Mr. John Sim, said that Mr. Hamilton could only have got inside the hopper by climbing the stairway outside the bunker. As it was still under construction at the time, there was a notice at the foot of the stairs prohibiting people from using them without authority. Mr. Sim said that Mr. Hamilton had no right to be on the hopper and added that anyone who went up there in darkness was taking his life in his hands.

MANPOWER WASTAGE

North-Western NCB Problems

SUBSTANTIAL cuts in the present rate of manpower wastage from Lancashire collieries would go far towards solving the manpower problems of the North-Western Divisional Coal Board, said the chairman, Col. G. G. H. Bolton, at the annual conference of the Lancashire Area of the National Union of Mineworkers at Blackpool last Friday. Col. Bolton said that the rate of wastage had exceeded expectations for some time and had given the division much concern.

"But even in a period of restricted demand there are limits below which the number of workmen must not be allowed to fall," he went on, "otherwise not only will there be failure to achieve the planned output, but efficiency of operation will suffer as well. In these days, particularly, when we are striving with might and main to keep coal competitive we must avoid, if it is humanly possible, any loss of efficiency."

Many men left the industry under the mistaken idea that it held no future for them, Col. Bolton continued. "Coal will be needed for a long time yet for one purpose or another and men will be needed to produce it—at fewer but larger average size pits than before. As old and uneconomic pits —mostly small—have been closed, the industry has been emerging more streamlined and efficient."

Stocks Depleted

Good inroads had been made into the division's coal stocks since last winter, he said, and the marketing department had been strengthened by the appointment of additional representatives. Divisional output fell last year, but productivity had improved. Output per manshift in 1958 was 64.5 cwt. at the face and 23.2 cwt. overall. Last year, the corresponding figures were 70.2 cwt. and 24.8 cwt. New annual records had thus been established, he said, and the improvements had exceeded those of any previous year. In the first quarter of this year, o.m.s. at the face averaged 76.6 cwt. and overall 26.7 cwt.

Col. Bolton reported a considerable fall in output loss caused by disputes in 1959. This could not unfortunately be said for the first quarter of 1960, during which the loss was nearly double the corresponding figure last year. Absenteeism in 1959 had deteriorated to 17.74 (16.31) per cent. at the face and 15.58 (14.31) per cent. overall. Col Bolton commented: "I thought that when the extended hours working was discontinued the absence percentage would fall but in fact it has risen. I do want to re-emphasize that regular attendance at work does still matter—it is a prerequisite for securing operating efficiency."

He reminded his audience that despite the contraction of the industry, the board was still the world's biggest business organization. "There is a need, therefore, for every one of us to retain our confidence in its future," he said. "A defeatist attitude would be entirely misplaced and would help nobody. Don't be misled by what is said by some of the industry's critics, who I suppose are in reality critics of nationalization rather than of its practice or product."

EXPLOSION at the Hlubina mine, in Ostrava, Czechoslovakia, on Sunday killed 54 miners. An investigation is taking place.

Why Boys Won't Go "Down the Mine"

REFERENCE was made publicly in both Yorkshire and Wales last week to the diminishing number of school-leavers entering the pits. Pit closures were blamed in Wales for the shortage of youths, but in Yorkshire the existence of more opportunities outside mining was given as the main reason.

The annual report of the Glamorgan Education Authority on the Youth Employment Service, commented: "Apart from the Neath and West Glamorgan division, it has been impossible to fill the outstanding vacancies with the NCB. At one time conditions in the mines deterred boys from accepting this work. While conditions have improved, the closure of pits has made it hard to convince boys and their parents that there is now a future in the industry."

The report added that the monthly average of outstanding vacancies increased from 288 to 353 mainly because of the outstanding vacancies for trainees with the NCB in the eastern part of the county. During the year, 551 boys entered the mining and quarrying industry in Glamorgan.

Mr. G. Stewardson, headmaster of Darfield county secondary school, in south Yorkshire, told the school governors last week that gloom about the future of coal mining was not to blame for the declining number of boys entering the industry, but rather the existence of more opportunities for employment. Only four of the 30 Easter school-leavers had entered the mines, he said. This was a decrease on previous years, but boys in the area were faced with little alternative to pit employment until a few years ago.

The Rev. W. Howard, Rector of Darfield, said he had been assured there was a future for the coal industry in Yorkshire for at least 20 years and urged that optimism should be encouraged. But another speaker, Mr. S. Upperdine, said that in view of the past history of the mines, it was difficult to inspire youngsters to go into them.

Conference on Industrial Safety Opens Today

TRADE exhibition of industrial safety appliances is being held in conjunction with the National Industrial Safety Conference which opens at Scarborough today (Friday). A wide range of specialized equipment, ranging from breathing apparatus to skin cleansers, will be exhibited by more than 70 firms.

The opening address will be given by the Minister of Labour, Mr. Edward Heath, and the conference will close at noon on Sunday.

Obituary

Mr. C. P. BATES

BY the death last Friday of Mr. Cecil Penry Bates, the Midlands has lost a well-known mining engineer and consultant. Mr. Bates, who was 59 began his mining career at Hamstead Colliery (Warwickshire) and Holditch Colliery (Staffs). He later qualified as a Fellow of the Royal Institution of Chartered Surveyors and the Geological Society and became a member of the Institution of Mining Engineers, the North Staffordshire branch of the National Association of Colliery Managers, and the Association of Mining Electrical and Mechanical Engineers.

For many years Mr. Bates was chairman of the Mining Surveyors' Committee of the RICS and had a wide connection as a consultant to many of the leading concerns in the coal, ironstone, ball clay, and sand and gravel industries. He played a prominent part in industrial and commercial negotiations, particularly during the transition of the coal industry from private to public ownership.

His family business was W. J. Bates & Sons (Newcastle), Limited, mining engineers, and he was also chairman of Coalmoor Basalt, Limited, Coalmoor Holdings, Limited, and Berry Hill (Engineers), Limited, and was a director of Berry Hill Brickworks, Limited.

MR. ROBERT PLOWRIGHT

THE death took place on Tuesday of last week of Mr. Robert Plowright, deputy chairman of Plowright Bros., Limited, the Chesterfield firm of mining and mechanical equipment manufacturers. He was 75. A grandson of the founder of the firm, Mr. Plowright joined it as an engineering pupil and in 1926 succeeded Mr. James Bagshawe as chairman and managing director.

Under his management, the company acquired the engineering firms of Dewhurst's, Limited, and Savile Engineering, Limited, and as a result of specialization its interests were considerably expanded, particularly in oversea markets. Some years ago the Bestwood Company, Limited, took over Plowright Bros., and Mr. Plowright continued as chairman until 1956 when he became deputy.

Mr. JOSEPH FENWICK BELL, a former colliery manager in Co. Durham, has died at the age of 82. Mr. Bell was a member of Durham City Council from 1937 until 1950 and mayor in 1944.

The death occurred on Thursday of last week of Mr. CHARLES HAYES FRANKLAND, formerly a director of British Insulated Callender's Construction Company, Limited. He was 65.

Mr. WILLIAM GWENNAP, the founder of the Bednall (Staffs) firm of agricultural machinery manufacturers, William Gwennap (Agricultural), Limited, has died. He built the business up and was its proprietor until three years ago when it was taken over by Rubery Owen & Company, Limited, Darlaston, Wednesbury (Staffs). Mr. Gwennap was 71.

South African colliery shaft-sinking expert, Mr. CAMERON MCLAUCHLAN, who helped to set up a British record for shaft-sinking last year, has died in Paris. At Parkside Colliery, Newton-le-Willows (Lancs), in February last year, Mr. McLauchlan was the leader of 12 South African mining engineers who sank two shafts to a depth of 2,667 ft., at an average speed of 257 ft. a month.

Mr. GEORGE MARSHALL, who retired from the mining industry about 10 years ago, has died at the age of 77. He was under-manager at Donibristle Colliery (Fife) and was later promoted manager and transferred to Mossbeath Colliery (Fife) where he continued until the closure of the pit. His last appointment before his retirement was as manager of Blairenbathie Colliery.

The death has occurred suddenly at the age of 50 of Mr. STANLEY D. HODGSON, for the past 18 months technical director of the Tees Side Bridge & Engineering Company, Limited, Middlesbrough. He has previously served as draughtsman, works engineer, and assistant manager with the company. Mr. Hodgson was an active member of the British Standards Institution and of the Hot Dip Galvanizers Association.

"West Durham Mining Will End by Turn of Century"

PREDICTING that coal mining would have ceased in West Durham by the end of the century, Mr. Robert Scarlett, assistant planning officer for Co. Durham, told a public inquiry at Crook on Tuesday that there would be mass migration unless new industry were introduced. Permission to use 105 acres of land near Brancepeth Colliery for industrial development was being sought by Crook and Willington UDC.

Mr. Scarlett said that the employment situation had worsened in the last 10 years with the rapid decline of coal mining and that if the proposed site were approved, employment might be provided for 3,000 people in an area desperately short of new jobs.

A public inquiry at Heanor (Derbyshire) on Tuesday heard about the problem of miners at pits closing down on the borders of Nottinghamshire and Derbyshire. Mr. S. Saville, senior planning assistant for Derbyshire County Council, pointed out that alternative work must be found when coal reserves in Heanor and district ran out. Since a provisional town map for Heanor had been prepared the need had been highlighted to allocate sites for industrial developments. The inquiry was into an appeal to build houses and bungalows in the town.

Opening of Crofton Mill Pit Baths

NEW £54,000 pithead baths at Crofton Mill Colliery, near Blyth (Northumberland) will be opened tomorrow (Saturday) by Mr. A. Wedgwood, staff director of the Northern (N&C) Divisional Coal Board. The baths have 65 showers and clothes lockers for 1,002 men. The usual bottle filling, boot greasing, and brushing facilities are provided and there is also a first-aid room and storage for 70 bicycles.

This installation is the third to be opened in Northumberland in 1960 and the 49th to come into operation in the division, whose programme of colliery welfare building is now nearing completion.

PESSIMISTS REBUKED

S. Wales Pit Critics "Should Know Better"

SHARP reply to people "closely associated with the industry" who suggested there might be a gloomy future for South Wales mining was made last weekend by Mr. D. M. Rees, chairman of the South-Western Divisional Coal Board. He declared: "If they have at heart the security of the people employed in the industry, they should know better than to suggest that the valleys are to be allowed to develop into dormitories, that a sense of insecurity exists, and that there will be a problem of maintaining opportunities for employment when mines are closed or about to close."

Mr. Rees said he had been very disturbed to read statements like this. He is believed to have been referring to remarks made by Mr. James Griffiths, MP for Llanelly, at the first meeting of the Welsh Grand Committee in the House of Commons, and in another speech at Porthcawl.

"My board and I cannot do more than to emphasize that there is undoubtedly security in the coal-mining industry in South Wales," Mr. Rees went on. "In most of the valleys, the remaining reserves of good coal lie at the top. These are pits where a good deal of money has been spent and the quality of the coal obtained at them is such as will be in demand for many years to come.

"Highly Damaging"

"In my opinion it is also very wrong to speak of alternative employment particularly at the sites at the top of the valleys. It would be far better if those making remarks highly damaging to South Wales would turn their efforts to point out the true state of affairs and to co-operate with the board in providing the necessary labour," he said. There was a shortage of 2,251 men, but re-entrants and juvenile recruitments reflected in the board's favour.

Since 1947, said Mr. Rees, the board had undertaken an extensive programme of reorganization and reconstruction of collieries throughout the division. The results of this were partially indicated in the profit of £409,000 made last year for the first time. Mr. Rees pointed out that the board had very substantial reserves of the coals which the nation needed in increasing quantities, and there were collieries and capital in such a condition as to allow these coals to be produced efficiently. The management and men, he stressed, were capable of providing standards of work and output equal to any in the country.

"The only limiting factor which can imperil the future of the people within and outside the industry in the division is the shortage of men," he said. "At present we have 89,000 men on the books and beyond 1965 as far as one can see into the future, it is estimated that we will need a manpower force in the region of 92,000 to 94,000 men."

In a reply to this statement, Mr. Griffiths commented: "I am neither an optimist nor an alarmist. I am a realist." He said he had a great admiration for Mr. Rees and his leadership. "My speech was designed to emphasize the major problem that now confronts us in Wales. I said that the problem of providing employment for the coastal belt was on the way to solution, but that the problem of the valleys remained. We require an all-out effort in the near future to save the valleys."

Mr. Griffiths said that it had proved difficult to attract industries to the valleys. "What I want to do," he went on, "is to take action in time and provide alternative employment against the day when existing industries may have to close. It is not only by changes in the coal industry that the valleys are affected. In times past many of the valleys had their own steel and tinplate works.

"These had to be closed with the development of the new giant plants on the coastal belt. It is because of this experience that I issued my plea that we all co-operate to save the valleys now."

Spanish Mining Engineers Invite Papers

TECHNICAL papers on a wide variety of subjects of interest to the mining engineer are invited for the first conference of the Association of Spanish Mining Engineers at Oviedo from October 3 to 8. Subjects include the fields of application of coal, coal washing, explosives, industrial chemicals, and productivity.

Papers should be sent in triplicate, accompanied by a resumé of about 400 words, and if possible, be relevant to industrial and economic conditions in Spain. So that papers may be printed and circulated among members well before the conference, the last date for arrival is July 15. They should be sent to Sr. José Somolinos Cuesta, Asociación de Ingenieros de Minas de España, Agrupación del Noroeste, Oviedo, Spain.

Call for Greater Care in Notts Pits

SECOND appeal this year for more diligence by workers and managements in the matter of safety was made by the Nottinghamshire Miners' Council on Saturday. Seven deaths have occurred in the county already this year, as against 11 in the whole of last year. The number of deaths in Nottinghamshire last year was half of the aggregate number recorded by the East Midlands Divisional Coal Board.

The council welcomed the move in Parliament to urge the provision of two-seater cars instead of motorized chairs for disabled miners. Mr. A. Martin, the secretary, said that the Coal Industry Social Welfare Organization had offered some time ago to pay the difference, but no move had been made by the Government. Remarking on the fact that cars had been provided for the war-disabled Mr. Martin said, "We think that all disabled persons, whether wounded in the war or injured at work, should be treated alike."

Personal

UNESCO Appointment Extended

AT the invitation of UNESCO, made at the request of the Indian Government, Prof. G. REGINALD BASHFORTH is to continue as Professor of Ferrous Production Metallurgy at the Banaras Hindu University, Varannasi, until the end of 1961. He took up the assignment, as specialist in metallurgy under the technical assistance programme of UNESCO, in October, 1958.

PROF. G. R. BASHFORTH

Prof. Bashforth retired as chief technical liaison officer for the Round Oak Steel Works, Limited, and other companies in the Tube Investment group in August, 1958, after 31 years' association with Round Oak. He was then due to join Coalmoor Refractories, Limited, in October that year in a technical and sales capacity, but he was granted a 12 months' leave of absence to take up the UNESCO appointment.

The author of the standard three-volume textbook, "The Manufacture of Steel," Prof. Bashforth has contributed a large number of articles to the technical press, his work having appeared from time to time in IRON AND COAL over the past 20 years. He served as president of the Staffordshire Iron and Steel Institute from 1939 to 1942.

DR. G. A. L. JOHNSON has been appointed Lecturer in Geology at the University of Durham.

Mr. FRANK FISHER, engineer-in-charge at Barley Hall Colliery (Yorks), has retired after 51 years in the industry.

Mr. GEORGE STOBERT, managing director of the Tyne Wire Rope Company, Limited, has been appointed a magistrate for South Shields.

Cllr. HUBERT GIBLIN, a steelworker for 35 years at John Lysaght's Scunthorpe Works, Limited, was on Monday installed as Mayor of Scunthorpe.

Mr. HERBERT JOHNSON has retired as manager of Ellistown Colliery (Leics). He received a presentation to mark the occasion from the unit electrical engineer, Mr. H. W. Insley.

Dr. W. J. KROLL, of Corvallis, Oregon, has been appointed the sixth Castner Memorial Lecturer. He will deliver his lecture, "The Fusion Electrolysis of Titanium," in Glasgow on Friday, October 7.

Mr. WILLIAM BENTLEY, managing director of the Bentley Engineering Group, Limited, hosiery machine builders, of Leicester, has been appointed chairman of the British Knitting Machine Builders' Association.

Chairman of the special sub-committee of the Shipbuilding Advisory Committee which is to study the future of the industry is to be Sir JAMES DUNNETT, Permanent Secretary to the Ministry of Transport.

The Master Cutler, Mr. P. J. C. BOVILL, who is managing director of Newton, Chambers & Company, Limited, is flying to New York on Wednesday with a gift for the Mayor of New York, Mr. Robert Wagner, from the Sheffield Cutlery Manufacturers' Association, now in its jubilee year. The gift is a case of 12 pairs of steak knives and forks and a pair of steak carvers.

A presentation was made recently to Mr. RICHARD MILES, former chairman and managing director of Head, Wrightson & Company, Limited, by the present chairman, Sir John Wrightson, on behalf of the board.

Mr. W. J. ODDIE, son of Mr. W. M. Oddie, managing director of Spencer & Halstead, Limited, makers of shot blast and ventilation plant, etc., of Ossett (Yorks), will represent the firm at the American Textile Machinery Exhibition at Atlantic City.

MR. GEORGE WHITE, who emigrated to America from Nuneaton in 1910, has retired after 50 years in the American mining industry. Mr. White, who is 81, became deputy State mines inspector of Kansas City, a post which he relinquished when he was 65 to become an official of Kansas State Prison.

Mr. R. W. ROWELL, manager of Seghill Colliery (Northumberland), since 1958, received a presentation from colleagues on his departure to become manager of Isabella Colliery, near Blyth. Mr. Rowell started work as a miner at the age of 14 and became undermanager at Rising Sun Colliery, Wallsend, in 1934, and manager of the Nelson Colliery 10 years later.

Mr. J. F. CARR, production manager of the Wakefield Area of the North-Eastern Divisional Coal Board, is to retire at the end of June. He has served in the industry for 52 years, starting in 1908 at Monk Bretton Colliery (Yorks). In 1928 he became undermanager there, and in 1953 he was appointed deputy production manager of the Wakefield Area, taking up his present post in 1955.

Dowding & Mills Acquires Southampton Firm

BUSINESS of Southern Electrical Repairs, Limited, 55, Millbrook Road, Southampton, has been acquired by Dowding & Mills, Limited, Birmingham, as from June 1.

Mr. A. H. Sockett, formerly owner of Southern Electrical Repairs, is to continue as Southampton manager for Dowding & Mills, and the general administration will be centred on the London branch, 24, White Post Lane, Hackney, E.9, under the management of Mr. P. L. Hollings, who has joined the board of the parent company.

The following appointments are announced by Dowding & Mills:—Mr. W. L. Henderson, previously London sales manager, as southern area sales manager; Mr. H. Glover, previously with Pyrotenax, Limited, as Midland area sales manager; Mr. J. Buck, formerly of Brownings' Electric Company, Limited, as technical engineer to the London branch; Mr. W. E. Halls as south-eastern area engineer representative for the London branch, covering mainly Kent, Sussex, and south-east London.

ONE-FOR-SIX SCRIP ISSUE is proposed by Demag, the German steel concern. This increases the ordinary capital to DM98,000,000 and the new shares will be entitled to the full 1959 dividend which is, therefore, effectively increased to 14 per cent. A one-for-four rights issue at 180 per cent. of par is proposed by the Rheinstahl undertaking (coal, steel, engineering). This would raise nominal capital from DM370,000,000 (about £31,500,000) to DM462,500,000.

In Parliament

DISPOSAL OF RTB

Chancellor Will Seek Advice

AFTER again refusing to indicate how big the capital issue of Richard Thomas & Baldwins, Limited, would be or when it would be made, the CHANCELLOR OF THE EXCHEQUER, Mr. Derick Heathcoat Amory, agreed that it was most important that so big a sale of assets should be made under conditions giving the best return to the taxpayer. He said that the responsibilty for deciding on and recommending the best method lay with the Iron and Steel Holding and Realisation Agency. "I think that I must leave it to them to give me its advice," he said.

MR. FREDERICK LEE (Lab.) said the responsibility lay not with the agency but with the Chancellor and the Government. "At the moment," he went on, "there is no problem because 52,000,000 people own all the capital and they are getting a terrific return on the capital of this most efficient unit of the steel industry. It is returning great profits to the nation every year, and it does great credit to the whole concept of nationalization."

He later asked whether any reason could be given to show that the company was not working efficiently in the interests of the nation. The reason for the Government's present policy, MR. AMORY replied, was the welfare of the nation at large.

MR. JAMES GRIFFITHS (Lab.) asked whether there was a single word to be said for denationalizing the industry and whether the workers could be consulted since they had played a very considerable part by skill and service. MR. AMORY said that the step being taken was in the long-term interest of the workers.

"Steel Industry Will Need More Coke"

THE steel industry is expected to need 2,500,000 tons more coke for blast furnaces this year than in 1959, said the MINISTER OF POWER, Mr. Richard Wood. He added that a further increase of 750,000 tons was expected in 1961 and that the coke-oven capacity either in being or under construction was sufficient to meet these needs.

MR. HAROLD NEAL (Lab.), who had earlier been told that 14 coke-oven plants had been closed since 1958 (one by the iron and steel industry and the remainder by the National Coal Board), suggested that the "gentleman's agreement" between the board and the steel industry over the production of industrial coke had been broken by the proposed erection of a plant in Scotland. "Which side is the Minister on in this controversy—the side of the private enterprise concern which has broken the agreement or the side of the National Coal Board?" he asked.

MR. WOOD did not think the agreement had been broken. With regard to the new Scottish plant of Colvilles, Limited, there were good technical reasons which made it impossible for the coke needed to be taken from outside. One reason was that the company would have had to transport its coke from Durham—more than 100 miles away.

STEEL IMPORTS

SUGGESTION that the increase in imports, particularly of sheet steel, could if it continued have a bad effect on balance of payments was made by MR. FREDERICK LEE (Lab.). He had been told by the MINISTER OF POWER, Mr. Richard Wood, that 80,000 tons of steel worth £5,700,000 were imported last March, compared with 32,000 tons, worth £1,900,000 in March, 1959. If this rate were maintained, the cost throughout the year would be £68,500,000, he contended.

Mr. Wood said that home production of these steels was expected to reach 2,800,000 tons this year, compared with 2,500,000 tons last year. The export of steel was still high, he said, because it was valuable to maintain export markets. Marginal shortages made it necessary to import steel on this scale, he told the House.

Answering a further question by MR. LEE, the MINISTER denied there had been failure to expand sufficiently. Production this year was one fifth above last year's level and more than one tenth above the previous record of 1957. It was a common experience, he said, that at a time of buoyant demand marginal shortages had to be made up by imports, which this year were less than in 1956.

EAST MIDLAND DOUBLES

EXPORTS of East Midlands doubles have been stepped up to meet oversea demands, said the MINISTER OF POWER, Mr. Richard Wood, in reply to MR. GEORGE JEGER (Lab.). He said that it had not yet, however, been possible to clear the 300,000 tons of this type of coal in stock.

MR. JEGER suggested that the National Coal Board might not be doing all it should to export this type of coal because the Minister had told him recently that there were 300,000 tons of this coal lying idle and a few weeks before that said there was an unsatisfied demand for this coal.

MR. WOOD said he understood the type which Mr. Jeger had in mind was virtually not included in the stock held in the East Midlands. The board had exported almost twice as much in the first quarter this

year than in the first quarter of 1959. The Minister said that Mr. Jeger's strictures were not entirely justified.

SPOIL HEAP CLEARANCE

CLEARANCE and improvement of colliery slag heaps is moving "at a very slow speed" said MR. ELLIS SMITH (Lab.). He said that large resources lying derelict could be improved with very little expenditure.

SIR KEITH JOSEPH, Parliamentary Secretary to the Ministry of Housing and Local Government, said that several schemes for reclaiming old spoil heaps for other uses or improving their appearance had been carried out or were under way. Progress appeared to be quickening in many districts, including Lancashire and Staffordshire. Sir Keith added that the Minister, Mr. Henry Brooke, had asked for a progress report from all affected local authorities.

COAL-BURNING POWER STATIONS

TWO power stations—Brunswick Wharf and Littlebrook "B"—which were due to be converted to oil burning this year will go on burning coal for at least two more years, said the MINISTER OF POWER, Mr. Richard Wood, answering MR. FREDERICK LEE (Lab.). He said there was a possibility of extending this agreement.

Pressed for further information, MR. WOOD said he did not want to say any more but added that he was not "wholly pessimistic." More progress might be achieved. MR. GEORGE JEGER (Lab.) asked the Minister whether he was aware of a recent statement that coal-burning generating stations were far cheaper than those burning oil. MR. WOOD said that in this case the costs were similar.

"NO" TO ENGINEERING INQUIRY

REQUEST for the establishment of an independent committee of inquiry into wages, conditions, differentials, and technical knowledge required of skilled engineers, was refused by the MINISTER OF LABOUR, Mr. Edward Heath. The request was made by MR. ELLIS SMITH (Lab.) in view of what he called increasing industrial unrest in the engineering industry.

Replying to a supplementary question by MR. SMITH, the MINISTER said that machinery already existed within the engineering industry to deal with these matters.

NO SURPLUS coke-oven gas will be available for sale to the Wales Gas Board from the new Spencer Works at Llanwern (Mon) of Richard Thomas & Baldwins, Limited, judging from developments so far approved, said the Minister of Power in a written reply to Mr. Ness Edwards (Lab.).

Ore Carrier Built in Record Time

SUNDERLAND shipbuilding firm, Austin & Pickersgill, Limited, has just built the 16,000 ton d.w. ore carrier Iron Barque, in the record time of 27 working weeks. She sailed from the Wear on Thursday of last week, on charter to the British Iron and Steel Corporation.

The managing director, Mr. Kenneth Douglas, commented: "This is the fastest rate of construction we have achieved for a ship of this type since we went over to modern methods of building." The Iron Barque is the second of two ore carriers built at this yard for the Vallum Shipping Company, Limited, of London. They are the biggest ships to be built by the company.

1,800-ft. Shaft Sunk at Hucknall No. 2

COMPLETELY new shaft, 1,800 ft. deep and 20 ft. in diameter, has been sunk to tap large reserves of virgin coal in the Deep Soft, Deep Hard, and Tupton seams at Hucknall No. 2 Colliery, near Nottingham. An existing shaft, originally sunk to the Deep Soft Seam but used recently only down to the shallower seams, has also been recovered to the Deep Soft.

These developments are part of a £3,000,000 reorganization scheme to give the 96-year-old pit an extra life of another 50 years. The scheme will in fact virtually create a new mine 900 ft. below existing workings, tapping deeper seams known to contain about 36,500,000 tons of good quality coal. Remaining reserves in the upper seams will be worked out during the next few years, and the new mine will be in operation by the time Hucknall reaches its centenary.

Towards the end of this year the new shaft (No. 5) and the recovered shaft (No. 4) will be connected for work to begin on the excavation of conveyor and locomotive tunnels and two return airways. A concrete headgear, erected above the new shaft, encloses and protects the pulley wheels and houses the sinking headgear.

Later this year, work will start on a new £200,000 welfare block at the pit and on new workshops. Work has already begun on a new, improved system of dirt disposal and there are plans for a new coal preparation plant.

Manager Blew Himself Up After Pit Closure

MANAGER and part-owner of Gwyn Colliery (Glam), whose licence had been withdrawn by the National Coal Board, worried at the closure of the pit and finally blew himself to pieces with explosive, a Pontardawe inquest was told on Tuesday. A verdict was recorded that Mr. Thomas Glyn Price (50) took his own life while the balance of his mind was disturbed.

Mr. William Handel Morgan, licence-holder of the mine and one of the four part-owners, said that Mr. Price was in complete charge. In January they had a month's notice from the board, saying the licence would be withdrawn because they had overstepped the boundary. Theye were given a month's grace, but the colliery was closed on March 31, and Mr. Price had been very depressed about it. He had lost his regular employment since then, but was still going backward and forward to the mine in case there was an opportunity to reopen it.

Anglo-Polish Trade Agreement

REPRESENTATIVES of the UK and Polish Governments have signed a new trade agreement providing a basis for trade for the three-year period beginning on July 1. Quotas for the 12 months from July 1, envisage an increase in UK exports from £16,500,000 in 1959 to about £20,000,000 and an increase in Polish exports from about £33,000,000 in 1959 to about £35,000,000.

Included in the quota list for UK exports to Poland are capital goods, machinery and equipment.

Effect of Pouring Practice on QUALITY OF SLAB INGOTS *and Rolled Products*

This is an abridged translation of a paper in Metallurg (No. 8, 1958). The authors, G. A. Chikalenko and E. V. Shevbunov, describe how an improvement in ingot and plate quality was obtained by a small change in pouring practice. The paper is of additional interest because the two-inlet bottom pouring system used at the Ilicha works is unusual. Comments from readers with experience of a two-inlet pouring system for ingots would be welcome. They may be addressed to the Metallurgical Editor.

AT the present time at the Ilicha works, slab ingots of 5 to 6 tons of carbon boiler plate steels are bottom-poured in wide-end-up closed bottom moulds with two inlets in the bottom (Fig. 1) and fitted with a feeder head. The metal is poured from a 130-ton ladle through nozzles of 40 to 45 mm. (1.6 to 1.8 in.) dia. On each bottom plate there are four moulds. The bottom pouring trumpet is made of bricks with an internal dia. of 50 mm. (2 in.) The metal enters the mould through two fireclay nozzles of divergent form of exit dia. 60 mm. (2.36 in.) (Fig. 2*a*) inserted in the bottom of the mould. The time of filling the body of the ingot is 4.5 to 6 min. and of the head—1.5 to 2.0 min.

The surface of the metal in the head is covered with a "lunkerite"-type compound of composition 45 per cent. chamotte (grain size not greater than 5 mm.) (0.2 in.) and 55 per cent. coke (grain not greater than 8 mm.) (0.3 in.).

Thin Crust Formation

With such method of pouring, early formation of a thin crust was observed on the surface of the rising metal in the mould; in consequence of this it was impossible to reduce the occurrence of laminated sheets appreciably. Investigations showed that this defect is caused by local segregations of exogenous non-metallic inclusions.

In order to prevent the early formation of the crust on the surface of the metal in the mould, it is necessary to increase the velocity of the metal as it enters the mould. This can be achieved either by:—(i) increasing the linear rate of pouring, or (ii) decreasing the exit cross-sectional area of the feeder nozzle aperture into the mould. The first method is liable to cause cracking of ingots.

Inspection of cracks in large quantity of ingots showed that all were of the surface hot-crack type, some being longitudinal and some transverse with the reference to the main axis of the ingot.

Transverse cracks were mainly found under the shrinkage head on the broad faces of ingots and were the type of cracks which result from hanging of the ingot at the junction of the feeder head and mould due either to wear at that point or unsatisfactory fitting of the feeder head. Longitudinal

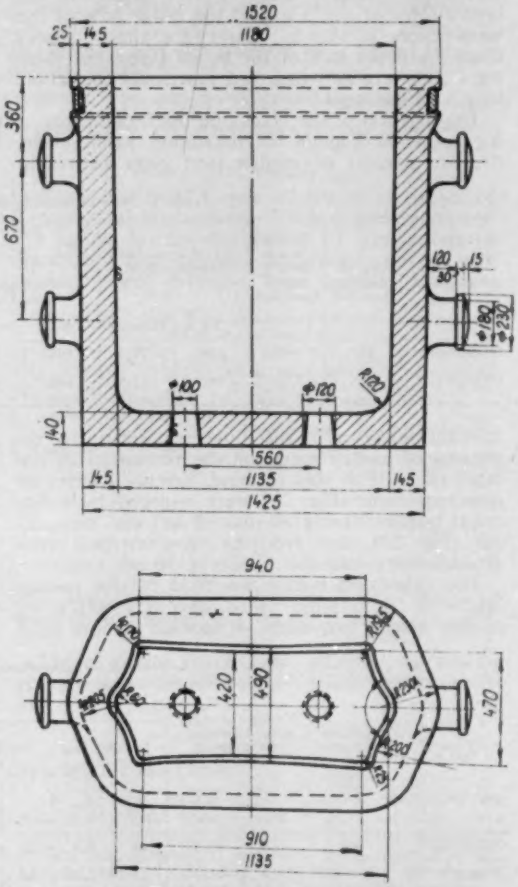


FIG. 1.—MOULD FOR 6-TON SLAB INGOTS.

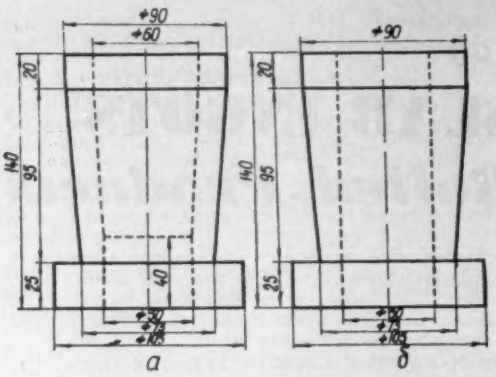


FIG. 2.—FIRECLAY NOZZLES: (*a*) DIVERGENT TYPE; (*b*) CYLINDRICAL TYPE.

cracks on surfaces of ingots were mainly in the centre third of the width of the lower half of the broad faces of ingots. They were almost absent from the upper half of the broad faces, but there were some cracks which ran practically the whole length of the ingot.

The location of the cracks on the broad faces of ingots in the regions of maximum agitation by the two streams of molten steel gives an insight into the influence of the movement set up by the streams of molten metal on the formation of the ingot skin. With this in mind, fireclay nozzles of divergent form (Fig. 2*a*) were replaced by cylindrical nozzles having 50 mm. (2 in.) dia. throughout (Fig. 2*b*), thus reducing cross-sectional area of each entry into the mould by 30 per cent.

This cylindrical nozzle was tried out for casting ingots of 5- to 6-ton killed steel (CT3SP) using moulds having two inlets. It enabled a more solid entry stream to be obtained for a lower linear rate of pouring and thus delayed the formation of a dense thick crust on the surface of rising metal.

Comparative data taken from casts made during the same period characterizing the surface quality of slab ingots through cylindrical nozzles and slab ingots poured through divergent nozzles are given in Table 1. It should be noted that these data refer to the state of the broad faces of the ingots (in general, the number of broad faces inspected was twice the number of ingots). In some cases there were cracks on one but not on the other side of the ingot.

Table 1 shows that the change of the shape of nozzles from divergent to cylindrical form led to a reduction of longitudinal and transverse cracks, that is, to an improvement of quality of the surface of ingots. This is obviously a result of the hindering influence of the entering stream of metal on the formation of the ingot skin.

After rolling the slab ingots, mostly to plates of thickness 25 to 40 mm. (1 to 1.6 in.), the surface and sheared ends of the plates were carefully examined. The quality of plates rolled from ingots poured through divergent nozzles and cylindrical nozzles are compared in Table 2. This shows that the improvement in quality of the broad faces of slab ingots (*i.e.*, less longitudinal and transverse cracks) resulted in better quality of plates with regard to crack defects. However, the most important influence of the application of cylindrical nozzles was the prevention of lamination defects, which were markedly lower.

The decrease of laminations in slabs is explained by the fact that with the same rate of pouring, the surface of the rising metal in the mould remained clear for a considerable time when cylindrical feeders were used, *i.e.*, the rate of crust formation on the surface of rising metal was

(*Contd. on facing page, col. 2*)

TABLE 1.—*Characteristics of the Surface Quality of Ingots.*

Type of nozzle.	No. of ingots examined.	No. of broad faces of ingots examined.	No. of broad faces without defects.		Broad side faces with defects.							
					Longitudinal cracks.		Transverse cracks.		Inclusions of refractory material.		Bottom splash.	
			No.	Per cent.	No.	Per cent.	No.	Per cent.	No.	Per cent.	No.	Per cent.
Cylindrical ..	425	850	640	75.3	104	12.2	72	8.48	30	3.55	4	0.47
Divergent ..	378	756	447	59.3	150	19.8	114	15.0	42	5.5	3	0.40

TABLE 2.—*Characteristics of Quality of the Slab.*

Type of nozzle.	Number of ingots rolled into slabs.	Number of slabs with defects of metallurgical origin.		Classification of defects.											
				Longitudinal cracks.		Transverse cracks.		Laminations.		Scab.		Inclusions of refractories.		Bottom splash type.	
		No.	Per cent.	No.	Per cent.	No.	Per cent.	No.	Per cent.	No.	Per cent.	No.	Per cent.	No.	Per cent.
Cylindrical ..	434	122	28.1	17	3.9	38	8.8	43	9.9	14	3.2	8	1.84	2	0.46
Divergent ..	394	135	34.35	21	5.35	35	8.9	66	16.8	8	2.05	1	0.25	4	1.0

Steelmaking Changes in the '60s

PIG-IRON production this year should reach a record level of about 16,000,000 tons, according to the annual report of the British Iron and Steel Federation for 1959, issued last Friday. Crude steel production, it is stated, should reach, and may pass, 24,000,000 tons, a record figure some 20 per cent. higher than last year.

The level of almost all finished products should increase considerably, with an especially substantial increase in steel sheet. If consumers build up stocks on anything like the scale of the 1955-57 period, then the industry may find itself hard put to meet all the demands made upon it.

In a foreword to the report, Mr. Richard Summers, president of the federation, says: "The experience of the last five years has shown the extent to which real swings in steel consumption can be magnified by the further changes in consumer stock policies which they provoke. Both the industry and its customers are hurt by these violent and unnecessary swings and both would benefit if ways could be found of moderating them." He also states that: "Despite the impact of the recession, capital expenditure in each of the years 1958 and 1959 was running at a rate of about £100,000,000. This year the industry expects to spend nearly a quarter more."

Consumer Durable Goods

The industry is at present engaged in estimating the likely demand for its products in the '60s. A working party completed its report in January, 1960, and while the estimates are subject to possible reconsideration, it is likely that in the home market the consumers whose steel requirements should be expected to grow at a particularly fast rate are the motor and general engineering industries, especially those making consumer durable goods. The steel requirements of the coal mining and railway industries are expected to fall and the shipbuilding industry's requirements to rise comparatively little. In oversea markets the prospects for a growth in total direct exports of steel are expected to be favourable.

Mr. Summers emphasizes that: "It is clear that the '60s will bring a much more competitive steel market. As technical progress speeds up, steel will face a widening range of substitute materials, such as concrete, plastics, and aluminium, but the British steel industry is confident that it can expand its market in the face of this challenge. Recent developments in European integration will reinforce this trend towards more competitive markets.

"The new European Free Trade Association seems, on balance, to offer advantages, despite the heavier competition for some sections of the industry which it may bring."

Companies have been asked to give the federation an indication of their future intentions as to modernization and expansion. It looks as if the emphasis in the next phase of development will shift away from rapid overall expansion to ensure that the pattern of finished steel production is adapted to the rapid changes taking place in the economy and, secondly, that the industry must be even more closely concerned with efficiency of production and its costs. In the highly competitive nature of the steel market in the '60s cost efficiency will be the key to success.

In steelmaking in particular it looks as if the '60s will see a drastic change in the pattern of production, with a marked growth of output from the new pneumatic processes and electric furnaces and with the use of oxygen as one of the primary steelmaking raw materials.

"Technical developments now under way," Mr. Summers concludes, "should be able to bring stability or even a reduction in the cost of British steel over the next decade if the community at large is able to conduct its affairs with sufficient restraint to avoid a constantly rising general level of prices. The year ahead offers a high level of activity in the industry and the prospect of a record level of of steel output."

EFFECT OF POURING PRACTICE

(Contd. from previous page)

lowered; this crust is one of the main causes of formation of laminations. Table 3 gives comparative figures for the distribution of laminations on the sheared ends of plates from ingots poured with cylindrical and divergent type nozzles. It shows

TABLE 3.—*Distribution of Laminations with Reference to their Position on the Sheared Ends.*

Position of laminations on the sheared ends	Plates with laminations expressed as percentage of total number of inspected plates from ingots poured by:—	
	Cylindrical type of nozzle.	Divergent type of nozzle.
Front face { Upper	3.7	4.6
Front face { Bottom ..	3.7	5.3
Side	2.5	6.9
Number of slabs inspected ..	434	394

that the change to cylindrical nozzles made it possible to reduce the quantity of side laminations.

These nozzles have been adopted as routine practice in open-hearth shop No. 2 for bottom pouring of slab ingots.

Sutcliffe Lioness Drive

The Lioness 25-h.p. tandem drive, illustrated on page 1034 of the May 6 issue of IRON AND COAL in a report on the recent Mechanical Handling Exhibition at Olympia, London, is a product of Richard Sutcliffe, Limited, Horbury (Yorks). The drive was shown with neoprene-bonded drums, which is a Sutcliffe service.

New Literature

NEW catalogues, booklets, and other publications which have recently been received include those mentioned below. They are acknowledged with thanks.

DAVY & UNITED ENGINEERING COMPANY, LIMITED, Darnall Works, Sheffield 9—Davy-United's place in the British consortium, ISCON, which is building the Durgapur steelworks in West Bengal, is outlined in publication No. 144. It is a non-technical brochure produced primarily for the use of visitors to Durgapur.

CENTRAL ELECTRICITY GENERATING BOARD, Winsley Street, London, W.1—"Pattern of Power" (publication G194) is a 40-page booklet relating in words and pictures the board's development programme.

ELECTRIC RESISTANCE FURNACE COMPANY, LIMITED, Netherby, 161, Queens Road, Weybridge (Surrey)—The April number is the third issue of the EFCO Journal. An article on "'Micron' Precision Taper Roller Bearings and their Heat Treatment," by J. D. Tyler and H. J. Tucker, is the main feature of an interesting issue.

WICKMAN, LIMITED, Coventry—The latest technical bulletin (FTB/10) deals with the Schaublin 20, a rotary transfer machine recently introduced by the firm of Schaublin S.A., of Bevilard.

HENRY SIMON (HOLDINGS), LIMITED, Cheadle Heath, Stockport—April issue of the Simon Magazine contains an extremely interesting review of the Simon engineering group by Mr. Anthony Simon, who gives up-to-date information on the activities of the various sections of the companies.

MONSANTO CHEMICALS, LIMITED, Monsanto House, 10-18, Victoria Street, London, S.W.1—Extensive use of colour printing makes the latest issue of Monsanto Mail a most attractive publication. In view of the cost of production it is not surprising that the company emphasizes that it must inevitably have a restricted circulation.

BRITISH WEDGE WIRE COMPANY, LIMITED, Elmswood House, 52, Bounds Green Road, London, N.11—Publication No. 130, a single-leaf brochure, gives details of the new Contour conveyor.

LOCKER INDUSTRIES, LIMITED, Warrington (Lancs)—The company has issued a pamphlet giving information on its "Amplitrol" natural frequency feeder.

LIGHT ALLOY CONSTRUCTION, LIMITED, Mowden Hall, Darlington (Co. Durham)—Economic service in all industries is offered by "Lacon" aluminium heavy-duty industrial ladders, a full description of which is contained in a recent pamphlet. Largest sales of the ladders so far are stated to be to the steel industry.

ASCOG, LIMITED, 44, Theobalds Road, London, W.C.1—A new list of the company's spiral water nozzles is now available.

GRAPHITE PRODUCTS, LIMITED, Northfields, Wandsworth Park, London, S.W.18—The company has published an attractive brochure on its "Foliac" colloidal graphite for drop forge die lubrication.

RUSTON & HORNSBY, LIMITED, Lincoln—The Ruston 165DH diesel-hydraulic shunting locomotive is described in detail in publication 9863, which also refers briefly to other locomotives in the Ruston range.

BOWMAKER (PLANT), LIMITED—Details of Caterpillar tractors at work in the coal and other industries are contained in the spring issue of the company's Journal of Service.

LANCASHIRE DYNAMO NEVELIN, LIMITED, Hurst Green, Oxted (Surrey)—The company has issued an attractive brochure giving details of its silicon rectifiers (List N.120).

HIGH SPEED STEEL ALLOYS, LIMITED, Widnes (Lancs)—An article on "Hot Work Tool Steels" by Mr. Walter Sorby, of the English Steel Rolling Mills Corporation, Limited, is the feature of the latest issue of Alloy Metals Review.

GOUROCK ROPEWORK COMPANY, LIMITED, Port Glasgow—The company's new steel wire rope manual is in two main sections, the first dealing with the manufacture, handling, and installation of steel wire ropes and the second giving weights and breaking strains of all standard ropes normally used. The second section has been tab-indexed to make the information readily available.

WILFRID MARLEY, LIMITED, Workington (Cumberland)—A brochure outlining the Tesch-Johansson selective and automatic charging system will be of considerable interest to blast-furnace engineers. The Workington company is the sole licensee in Great Britain for the Swedish process.

FORTHCOMING EVENTS

MAY 29—JUNE 11

Iron and Steel Institute: Special meeting in Italy, including a joint meeting with the Associazione Italiano di Metallurgia in Milan on May 30 and 31.

JUNE 9

North of England Institute of Mining and Mechanical Engineers: Meeting in the lecture theatre of the institute, Neville Hall, Newcastle-upon-Tyne 1, at 2.30 p.m. "The Influence of Percussive Action on the Ploughability of Coal Seams," by Prof. E. L. J. Potts and F. F. Roxborough.

JUNE 29—JULY 1

Institution of Mining Engineers: Summer meeting in Cardiff. "The Degradation of Coal in Power Loading," by G. V. Standerline and Dr. S. Islwyn Evans, and "Pulmonary Disability Among Coal Miners, with Special Reference to the Pneumoconiosis Field Research," by John M. Rogan.

National Association of Colliery Managers

JUNE 13

Annual general meeting and conference at Southport (Lancs).

Rapid Roof-support Performance at Lancashire Pit

EXCELLENT performance in the installation of Dowty Roofmasters is reported from Bold Colliery in the No. 3 (St. Helens) Area of the North-Western Divisional Coal Board. The face is in the Crombouke Seam, 4 ft. thick, No. 2 Pit, Bold Colliery. It is 190 yd. long between the two gates, and the gradient along the face is 1 in 20 towards the loader gate.

Prior to installation of the Roofmasters, the face was equipped with a panzer conveyor and shearer loader, and the roof supported by Dowty Duke props, 1,000-mm. link bars, with the goaf strip packed. Installation of the Roofmasters commenced at 2 p.m. on May 6 and was completed at 9.45 p.m. on May 8 (total seven shifts). A small Sunday night-shift team spent the shift clearing the rest of the surplus props and bars from the face, and on Monday morning coal was produced as usual.

It is believed that this is the lowest installation period yet recorded.

Material Control and Salvage in Mines

INTRODUCING A BUDGET SYSTEM FOR SUPPLIES

By D. SMITH*

The cost of materials amounts to a substantial proportion of the total cost of production, and it is obvious that they should claim urgent attention. A system of budgeting for materials is described in this paper, presented to the South Midland Branch of the National Association of Colliery Managers on November 2, 1959. Stress is also laid on the importance of salvaging worked-out districts, and the author suggests that a complete underground survey of recoverable materials should be made.

ECONOMIC circumstances have changed rapidly since 1957, and attention has been directed towards profitability. It has become increasingly obvious that, while the object is still to produce coal, it must be produced economically. Higher efficiency must be the aim, not only in mechanization production techniques, but in management techniques. This means a critical examination of customs and prejudices, and a rejection of systems which are not calculated to make for overall efficiency.

As material costs amount to a substantial proportion of the total cost of production, it is obvious that they should claim urgent attention. A draft paper on production control by the headquarters production department of the National Coal Board states: "For daily control a budget should be drawn up for the use of materials at the colliery. The budget should be based on the actual requirements of each working place, and should be discussed with the under-officials concerned. It should include the Salvage Plan for the pit." It is the construction of this budget and the later follow-up procedure which forms the basis of this paper, together with a survey of salvage organization.

Introduction of Budgeting

It would be true to say that all the many systems of control of issues which have been developed over the years have had the same aims, namely, to get materials in the correct quantity, of the correct type, to the correct place, at the correct time, as speedily as possible, and using as little manpower as possible. The budget must be designed to keep these factors in mind.

Changing systems which may have been in use for many years is usually a difficult and tedious task. Introducing control of materials by budgeting is no exception. Men and officials are inclined to look upon it as an unnecessary evil, which is designed to deprive them of some freedom of movement. This is bound to occur, and steps must be taken to prove to them that the introduction of control of materials is of common interest. It is suggested that the right way to do this is to meet all who are likely to be concerned with the scheme, and explain why the system is being introduced.

It may be that in some areas or some isolated pits in some areas the appointment of a supplies official is considered unnecessary. This may be so, but certainly it should not be discarded without a great deal of thought.

If such an appointment is made, the official should be charged with the responsibility of all movement of materials, ensuring rapid return of empty trams, the maintenance of supply routes, and the correct routing of materials. In all, he should be the complete liaison officer between surface and underground organization, having a complete knowledge of the state and position of all salvage areas.

The Budget

To conform with daily production control, an output budget should be laid down for the following week by the undermanager and cost clerk after prior consultation with the manager. This should be done on Thursday to allow for realistic budgeting. Thursday is suggested because by that time it is usually possible to say with certainty which faces will work during the following week. From this budgeted output, the supplies official, in consultation with the undermanager, should be in a position to set down in detail the amounts of each type of material required for each face.

A suggested arrangement for this sheet (Table 1) lists all materials which are likely to be used, along with their relative classification number and the standard price of each item. The supplies official,

* Manager, Merry Lees Colliery, No. 7 Area, East Midlands Divisional Coal Board.

TABLE 1.—*Material Usage and Costs, Budgets and Actual.*

UNIT F.23 Ref.		MATERIALS		Thickness (Ft. in.) Length of Face (Yd.) Advance per week (Ft. in.)	BUDGET 5 ft. 9 in. 119 22 ft. 6 in.				SEAM/DISTRICT Nether 21's Week ended July 25, 1959 ACTUAL 5 ft. 7 in. 119 22 ft. 0 in.						
					Quan. Required				Quantities Issued						
	Classn.	Descriptions	Units	Standard Price	Total	Less Salv. Mat.	Net	Cost	Mon.	Tues.	Wed.	Thur.	Fri.	Total
				s. d.				£ s. d.						
8(a) Roof Supports—Face Timber	05	Splits, 5 ft.	No.	2 5	—	—	—	—	—	—	—	—	—	—
	05	,, 6 ft.	No.	4 3	60	—	60	12 15 0	36	—	24	—	—	60
	05	,, 7 ft.	No.	4 9½	—	—	—	—		—	—	—	—	—
	05	,, 9 ft.	No.	7 9½	5	—	5	1 19 1	5	—	—	—	—	5
	05	Chocks, 2 ft.	No.	2 7½	100	—	100	13 2 6	50	—	50	—	—	100
	05	Cover boards, 4 ft. 6 in.	No.	3 0½	400	—	400	60 16 8	120	—	160	—	120	400
	05	Cutter nogs, 12 in. by 6 in. by 3½ in.	No.	1 1	60	—	60	3 5 0	60	—	—	—	—	60
	05	Lids, 6 in. by 6 in. by 1 in.	No.	0 1½	—	—	—	—	—	—	—	—	—	—
	05	Props, 5 ft. 6 in.	No.	6 1½	60	—	60	18 8 9	30	—	30	—	—	60
	05	,, 5 ft.	No.	4 7½	—	—	—	—	—	—	—	—	—	—
								110 7 0						
8(b) Roof Supports—Face Rigid Steel														
	02A	Steel bars, 7 ft.	No.	17 8	30	—	30	26 10 0	30	—	—	—	—	30
	03A	Steel joists, 3½ in. by 3½ in.	Ft.	4 11	20	20	—	—	—	—	—	—	—	—
								26 10 0						
8(c) Roof Supports—Face Adj. Steel														
	02B	Dobson props	No.		—	—	—	—	—	—	—	—	—	—
8(d) Roof Supports—Face Other														
					—	—	—	—	—	—	—	—	—	—
9(a) Roof Supports—Road Timber	05	Splits, 7 ft.	No.	4 9½	14	—	14	3 6 10	14	—	—	—	—	14
	05	Chocks, 9 in.	No.	1 5½	100	—	100	7 7 11	40	—	40	—	20	100
	05	Cover boards, 4 ft. 6 in.	No.	3 0½	450	100	350	53 4 7	140	—	140	—	70	350
	05	Props, 4 ft. 6 in.	No.	3 5½	—	—	—	—	—	—	—	—	—	—
								63 19 4						
9(b) Roof Supports—Road Steel	01	Arches, 11 ft. by 9 ft. by 4½ in. by 4½ in.	Sets	209 6	14	14	—	—	—	—	—	—	—	—
	01	Hammerlock struts, 3 ft. 6 in. by 4½ in.	No.	4 11	84	34	50	12 5 10	50	—	—	—	—	50
	01	Clamps, 11 in.	No.	0 7½	34	6	28	0 17 6	28	—	—	—	—	28
	03A	Steel joists, 3½ in. by 3½ in.	Ft.	4 11	—	—	—	—	—	—	—	—	—	—
	—	Stilts	—	30 6	28	20	8	12 4 0	8	—	—	—	—	8
								25 7 4						
9(c) Roof Supports—Road Other	01	Tunnel units	No.		—	—	—	—	—	—	—	—	—	—
10 General Stores	04	Tub rails, 18 ft. at 30 lb./yd.	No.	68 3½	—	—	—	—	—	—	—	—	—	—
	05	Sleepers, 3 ft. by 6 in. by 3 in.	No.	1 11½	—	—	—	—	—	—	—	—	—	—
	08	Oil	Gall.		—	—	—	—	—	—	—	—	—	—
	09	Unigel, ⅛ in.	Lb.	1 9.36	120	—	120	10 13 7	24	24	24	24	24	120
	—	Unifrax, ⅛ in.	Lb.	1 6.78	160	—	160	12 10 5	32	32	32	32	32	160
	—	Detonators, 72 in.	No.	0 4.69	70	—	70	1 7 4	14	14	14	14	14	70
	—	,, 96 in.	No.	0 5.37	300	—	300	6 14 3	60	60	60	60	60	300
	—	Stemming bags, 18 in. by 2 in.	No.	0 1.311	370	—	370	2 0 5	74	74	74	74	74	370
								33 6 0						
	10	Belting, 24 in.	Ft.	18 8	—	—	—	—	—	—	—	—	—	—
	—	,, 30 in.	Ft.	23 3	225	75	150	174 7 6	150	—	—	—	—	150
	—	Joints MM.12	Tins	26 8	2	—	2	2 13 4	2	—	—	—	—	2
	—	Belt rods, 23 in.	No.	0 3½	—	—	—	—	—	—	—	—	—	—
	—	,, 29 in.	No.	0 3¾	—	—	—	—	—	—	—	—	—	—
								177 0 10						
	11	Wire rope	Ft.		—	—	—	—	—	—	—	—	—	—
	55	Conveyor Structure, 30 in.	Yd.	121 3	9	—	9	54 11 3	—	—	—	—	—	—
				TOTAL				£491 1 9						

Materials issued by (SIGNED BY STOREKEEPER) Date

Issues received by (SIGNED BY U/MANAGER) Date

along with the undermanager, should set down the quantity of each classification required for the following week, with allowance for salvaged material.

In addition to stating the total requirements of materials, the supplies official also records, for the benefit of the storekeeper, the days on which the materials should be sent in to the pit. Such things as oil, powder, belt rods, and joints are commodities which can be used wastefully and are not normally kept under strict control. Details are important and this type of presentation shows up those details.

From here, it is necessary that the cost clerk produces the cost of each budgeted item for each district, so that, ultimately, district costs of "Budget against Actual" can be produced. It is important that deputies and overmen are issued with these, so that the high cost of materials is kept constantly in front of them. It is only necessary to issue the deputy with his own district costs, but the overmen and supplies officials should have a complete copy of all the districts which concern them.

A copy of the materials usage and cost sheet is retained by the supplies official so that he can programme the supplies into the pit; another copy of the sheet is handed to the storekeeper to be used as the official order form for a week's supply. One of these is prepared for each district to replace the more usually used order-book.

In the interests of efficiency it seems desirable, where possible, to organize a weekly delivery of materials with a set team of men. However, in many instances, particularly on conventional faces, this may not be practicable, and a set organization must be laid down between the supplies official and the storekeeper to phase deliveries into the pit. This is a function of management which will need to be examined for each district in the pit to get maximum efficiency.

Function of the Storekeeper

The importance of good storekeeping cannot be over-emphasized. Whatever system of control is introduced is useless, unless the storekeeper is in full command of the stores for which he is responsible. The procedure for withdrawing stores must be properly defined and strictly enforced. There are far too many instances of men being allowed to go into the stores and take materials from the shelves. When this does occur, as often as not, there is no record of their visit. There appears to be much room for improvement at older pits in the housing of storekeepers, so that they can be in closer contact with their job.

Thought should be given to positioning the storekeeper's office, so that he can supervize all issues. This arrangement is being taken care of at new collieries, but needs examination at some of our older pits. The storekeeper should not allow himself to be bogged down in the office to the extent of failing to complete the important weekly examination of outside stock.

Attention to detail in the construction of the budget and also in the methods of supply is essential. The day-to-day management of a colliery does not permit the manager sufficient time to devote to breaking down all activities of materials control. This is a field for method study, which can bear very rich fruit, and of which colliery managers must take advantage. Many instances of success in this field can be quoted, and in the future, the more frequent use of method study techniques will make for more accurate and positive control.

Analysis of Materials Cost

It is thought by many that if physical issues are rigidly controlled, there is no need for the follow-up of calculation of costs, the argument being that if stores are needed then the ultimate cost must be borne. These views must be respected, and if daily stores were all that needed to be considered, the argument would probably be sound. However, proceeds and profitability must be considered, and these can only be expressed in sterling. It is sound reasoning that at pit level more effort will be made when it is known what margin of profit can be expected.

It is suggested for systemizing these results that an analysis of materials cost (Table 2) be prepared by the cost clerk from information given by the stores. The budgets and actuals for a week in respect of output should be shown, together with materials costs and material cost per ton, for each district and the total for the pit. The cumulative figures for the period for budget and actual costs should also be shown. By means of this analysis the manager knows the cost of authorized materials for each week before the week commences and can review the cumulative cost at the end of each week throughout each month.

Conditions and circumstances which need extra supplies to be issued will certainly arise. These excess issues must be routed through the supplies overman and undermanager. If the budget is realistic these will be small in number and can be authorized by the undermanager.

If there is anything of a larger nature, then the manager's approval must be given before issue. It is advisable in the initial stages of control to decide what level can be authorized by the undermanager and what needs the manager's approval. Any additional items are picked up from the stores by the cost clerk, so that he can adjust the actual costs which are presented on the analysis of materials cost.

Follow-up of Results

At this stage, a recapitulation of what has occurred may be useful. The manager and undermanager discuss generally which faces will be worked on the following week; the undermanager and cost clerk systemize the budget of output, stating from which face the output is to be won; the undermanager and supplies official set down the materials budget for the following week, and the supplies official phases delivery from the stores. The analysis of materials cost is prepared to the budget and budgeted costs stage so that the manager can see what his materials costs in relation

to output are likely to be; materials are controlled into the pit by the supplies official; and, finally, during the following week, the analysis is completed, showing the actual issues and actual costs.

It may be thought that if budgetary control is exercized in the manner which has been set out, the deputy plays no part in the procedure. This is a correct assumption in the purely mechanical procedure of setting down the budget and issuing stores, but it would be completely wrong to assume that he has no part to play in the success of the scheme. The supplies official is, of course, in close touch with the deputy and will discuss his needs with him before the budget is made. Whatever scheme is adopted, the deputy is a man who can either make or break it, and when introducing budgeting, he must be brought completely into the picture.

It is essential to keep the deputy interested; he must be given the final results so far as his district is concerned. It is suggested that the section of the analysis sheet relating to his district should be given to him.

However, that in itself is not sufficient. The meaning of the results must be explained to him, and he should be encouraged to discuss the results with senior officials. Deputies are important enough to warrant regular meetings, at which all aspects of control should be discussed. Experience has shown that to get the best out of our officials we must hold these meetings, not only to talk of costs or production, but to discuss with them any problems which they have in connection with their conditions of work.

General Stores

There are many other stores issues which have not been considered in terms of weekly budget, many examples of which create a heavy stores cost. Electrical equipment, such as switchgear, motors, lighting units, and cables, or mechanical equipment, such as ropes, cutter jibs, chains, etc., are all costly items which must in some way be controlled.

All items of expenditure which cannot be controlled by weekly budget must be reviewed and a periodic cost found. This must then be considered against future requirements and a sterling figure given for monthly expenditure. The mechanical engineer and electrical engineer must be

TABLE 2.—*Analysis of Materials Costs, Budgets and Actual.*

UNIT

Periods: (A) Weekly—Week Ended July 25, 1959
(B) Cumulative 2 weeks ending July 25, 1959
Accounting Period 4/5 weeks ending August 1, 1959

Seam	Slate		Slate		Slate		Nether		Nether		Nether		(A) WEEKLY TOTAL				(B) CUMULATIVE TOTAL			
District	10's		12's		17's		22's		23's		21's									
Saleable Output	BUD	ACT	BUD	ACT	BUD	ACT	BUD	ACT	BUD	ACT	BUD	ACT	Budget		Actual		Budget		Actual	
Tons	250	232	1926	1986	720	740	1185	1205	2480	2600	1568	1556	8129		8319		16258		16450	
F.23 Item	£	£	£	£	£	£	£	£	£	£	£	£	£	Cost per ton s. d.	£	Cost per ton s. d.	£	Cost per ton s. d.	£	Cost per ton s. d.
8. Roof supports—face:—																				
(a) Timber	35	30	100	110	50	55	126	100	195	211	110	110	616	1 6.2	616	1 5.8	1260	1 6.6	1285	1 6.8
(b) Rigid steel	—	22	80	80	—	—	—	—	60	—	27	27	167	4.9	129	3.7	340	5.0	326	4.8
(c) Adj. steel	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
(d) Other	—	—	—	—	—	—	—	10	—	—	—	—	—	—	10	0.3	—	—	10	0.1
9. Roof supports—road:—																				
(a) Timber	—	10	30	20	35	20	40	64	120	98	64	64	289	8.5	276	8.0	585	8.6	560	8.2
(b) Steel	—	—	25	16	70	35	20	42	140	156	25	25	280	8.3	274	8.0	580	8.6	595	8.7
(c) Other	—	—	—	—	—	—	—	—	—	12	—	—	—	—	12	0.3	20	0.3	12	0.2
10. General stores:—																				
Straight joists	—	—	—	—	—	—	—	10	—	—	—	—	—	—	10	0.3	—	—	10	0.1
Steel sections	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Other iron and steel	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mining timber	6	8	—	—	—	—	—	—	—	—	—	—	6	0.2	8	0.2	20	0.3	15	0.2
Other timber	—	—	10	12	—	—	—	—	—	—	—	—	10	0.3	12	0.3	20	0.3	25	0.4
Building requisites	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Oils and greases	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Explosives	21	17	40	45	35	30	50	52	110	105	33	33	289	8.3	282	8.1	580	8.6	565	8.2
Conveyor materials	6	—	4	4	10	10	—	30	5	5	—	—	25	0.7	49	1.4	50	0.7	100	1.4
Wire ropes	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Electrical cables	4	—	35	—	15	—	—	—	—	—	—	—	54	1.6	—	—	80	1.2	50	0.7
,, plant	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
,, spares	2	—	—	30	—	—	—	—	—	—	—	—	2	0.1	30	0.9	10	0.1	50	0.7
General stores (misc.)	—	8	30	30	20	24	35	20	70	64	—	—	155	4.6	146	4.2	300	4.4	310	4.5
Coal-face machinery	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Cutter and loader spares	—	—	17	12	—	—	30	—	—	—	—	—	47	1.4	12	0.3	100	1.5	25	0.4
Conveyor and drill spares	—	4	100	110	—	—	80	80	20	25	177	177	377	11.1	396	11.4	750	11.1	800	11.7
Other plant and equipment	—	—	—	—	—	—	—	—	—	—	55	55	55	1.6	55	1.6	100	1.5	110	1.6
Other plant and equipment (spares)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
TOTAL—General Stores	39	37	236	243	80	64	195	192	205	199	265	265	1020	2 6.1	1000	2 4.7	2010	2 5.7	2060	2 5.9
11. Repairs and renewals	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
12. Power, heat and light	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	74	99	471	469	235	174	381	408	720	676	491	491	2372	—	2317	—	4795	—	4848	—
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.		s. d.		s. d.		s. d.	
Cost per ton	5 11.0	8 8.5	4 10.7	4 10.7	6 6.3	4 8.4	6 5.1	6 9.2	5 9.7	5 2.4	6 3.2	6 3.7		5 10.0		5 6.8		5 10.8		5 10.7

brought into these reviews so that they can see the importance of examining their future requirements. It is more than likely that when forward budgeting of this type is examined, it will be found that estimated expenditure during the ensuing months will fluctuate. It is better not to try to cut down severly during one month and then suffer high costs the next, but to allow for even expenditure. Small stores, such as nuts, bolts, washers, etc., are difficult to budget, but these only amount to a very small percentage of the total cost of general stores, and it is consequently sufficient to take an average cost.

It is desirable that after the output budget has been produced a set allowance in sterling and budgeted cost per ton is allowed for the mechanical and electrical engineers to base their forward expenditure for each month. It is important to stress that the initial examination of historic costs must be used only as a guide and must not colour the views of the manager when he formulates his budget.

Salvage

In the drive for economic control of materials, salvage plays a prominent part. Control of withdrawal of materials is equally as important as control of issues. Salvage should include all materials which are re-usable, and should be organized, having due regard to the profitability of the operation.

It is important to know the size of the problem which faces the manager, and towards this end there must be a complete survey made of the whole pit and a plan prepared. This plan should show initially the roads salvaged, roads supported, with details of the type of support, and the sections of supported roads which would be uneconomic to salvage.

This survey can be carried out by the salvage deputy, so that the manager and undermanager can decide where the most beneficial salvage could initially take place. When this has been done, the salvage deputy must make a more detailed survey of the district, and set down systematically all materials to be withdrawn. At this stage the undermanager and supplies official should be able to assess from the information the materials which could be expected weekly to supplement the materials budget.

The salvage deputy must organize the systems of withdrawal and must keep complete records daily, weekly, and monthly. Tables 3 and 4 show suggested methods of tabulating the results of salvage. The salvage deputy must report weekly to the supplies official and present his records in order that due regard can be taken of them when the materials budget is formed. He must be in a position to say how many girders have been straightened, how many did not need straightening, and how many have been sent to scrap.

Underground Stocks

In a pit where there is a good deal of salvage work to be done, consideration should be given to creating an underground stock of salvage material. If such a stock is established it would serve as a balance so that salvage could be served into the supplies budget to keep a steady cost. If salvage is not readily available throughout the year it must be regulated to provide an even cost, which is better than having a low cost due to excess salvage for three months and then high cost due to no salvage at all for the rest of the year.

There is no reason why a suitable disused loader gate cannot be used for this purpose. Spaces along the road would be marked out for different sized arches, steel props, struts, sleepers, conveyor belt—in fact, anything which is salvageable. Near to the entrance should be a properly housed girder straightener, so that distorted arches could flow through without delay. It is worthwhile giving it

TABLE 3.—*Record of Salvaged Arches.*

Seam: Woodfield
District: Woodfield 4's Loader Gate

Salvage Commenced: Monday, October 5, 1959
Arches in Gate: 700

Week ended.	Recovered.	Not recovered.	Total left.	Steel joists.	Contractors.			Deputy.
					Day.	Afternoon.	Night.	
October 10	60	—	640	4	Rhodes Steel	—	—	R.J.
„ 17	76	4	560	—	Evans Dickens	—	—	R.J.
„ 24	73	2	485	—	Thomas Wain	—	—	R.J.
„ 31	60	—	425	—	Rhodes Steel	—	—	R.J
November 7	90	—	335	1	Evans Dickens	—	—	R.J.
„ 14	65	—	270	—	Thomas Wain	—	—	R.J.
„ 21	58	8	204	—	Rhodes Steel	—	—	R.J.
„ 28	106	4	94	—	Evans Dickens	—	Steel Rhodes	R.J.
December 5	60	—	34	—	Thomas Wain	—	—	R.J.
„ 12	24	10	10	1	Rhodes Steel	—	—	R.J.

Drawing off completed: December 8, 1958.
Sandbag stopping put on.

(Signed) R. JONES
Deputy.

TABLE 4.—*Total Salvage, September, 1959.*

Material.	Week ending 5	12	19	26	Total.
Arches—12 ft. by 9 ft.	60	—	—	—	60
,, 11 ft. by 9 ft.	—	60	76	73	209
,, 8 ft. by 8 ft.	40	30	30	30	130
,, 8 ft. by 8 ft.	60	70	65	40	235
Fishplates (with bolts)	140	150	160	120	570
Struts	300	408	330	400	1,438
Stilts	20	17	23	20	80
Sheets	150	220	150	308	828
Rails (4-yd. pairs)	35	30	40	28	133
Sleepers	90	95	70	85	340
Coverboards	120	140	60	80	400
Pipes, 2 in.	8	6	6	5	25
,, 2½ in.	8	6	6	5	25
R.S.J.s—6 in. by 5 in.	—	4 at 12 ft.	—	2 at 10 ft.	4 at 12 ft. 2 at 10 ft.
,, 3½ in. by 3½ in.	—	—	—	—	—
Corrugated bars	80 at 6 ft.	—	—	—	80 at 6 ft.
Rigid steel props	—	110 at 4½ ft.	—	—	110 at 4½ ft.
Adjustable props	24	—	—	—	24
Split bars—5 ft.	55	20	40	25	140
,, 6 ft.	—	—	—	—	—
Conveyor structure—30 in.	40	—	—	—	40
,, ,, 26 in.	—	—	—	—	—
Conveyor belting—30 in. yd.	250	—	—	—	250
,, ,, 26 in. yd.	—	—	—	—	—

a properly constructed housing with good lighting and adequate templates for all arch sections to give maximum efficiency. For speed in handling the arches through the straightener, the table of the machine should be 1 ft. 6 in. above floor level and set on a concrete floor.

Conveyor belt is a costly commodity which tends to get squandered when a district finishes. This also can be passed to production units via the underground stock. When the district finishes, every length of belt should have its ends trimmed where necessary, be tightly rolled for ease of transport, and have its length and width plainly marked in paint. This enables the salvage deputy and supplies official to know exactly what belt is on stock from salvage.

A salvage depot of this description would need servicing with haulage facilities so that materials could be taken in or out without difficulty. Salvage is an important part of economic control and it must be planned and organized if it is to give the best results.

Purchasing Department

The function of a purchasing department is to buy the right commodities in the right quantities at the right time. This is an ideal state of affairs, and one which cannot possibly be attained without the close co-operation of production and purchasing departments.

It is essential then that budgets for materials are made far enough ahead so that the supplies department can avoid, where possible, uneconomic purchases.

The difficulties are great, but if success is to be achieved this aspect of co-operation must be given adequate consideration. The department is there to help management and must be fully used by them.

Sir James Bowman, in an address given to the North of England Branch of the NACM in 1957, said: "The manager of today must really 'manage,' co-ordinating and controlling the work of others." Management must have the services of experts in many fields, including the field of purchasing, and should be prepared to use them.

Acknowledgment is made to Mr. A. Summers for the help which he has given in the preparation of this paper. The opinions expressed are the author's and not necessarily those of the National Coal Board.

DISCUSSION

MR. S. G. JOYCE asked if sufficient stress had been laid on the speed in salvaging in drawing-off districts and, bearing in mind the deterioration in roadway conditions and ventilation, whether the author would suggest that it was profitable to use top price men on the job.

Replying, the AUTHOR said salvage was of the utmost importance, and when a district finished, if it were possible, it should be salvaged immediately. The amount of stock which was involved in any district was tremendous and could be used immediately with a consequent lowering of costs. The method of salvaging a district depended on individual management.

Some managements preferred to do it in the manner suggested. In the author's opinion there should be a set salvage team which gave efficiency through experience. With such a team, properly organized and supervized, salvage was carried out quickly and at a low cost. Ventilation and roadway deterioration were automatically taken care of if salvage was started immediately a district finished.

MR. J. H. NORTHARD asked how many men engaged in the salvage operations should the salvage contract embrace. The progress of those withdrawing arches could, he thought, be restricted by the failure of the transporting system, and some incentive should be given to those engaged on these tasks.

Agreeing with Mr. Northard, the AUTHOR said a slack transport system would retard progress and consequently transport of salvaged material and girder straightening should be included in a salvage contract. He felt that the work within the salvage team should rotate to keep every salvage man in practice in each job and salvage paid as a pooled contract whenever it was possible.

MR. S. A. MCKEE asked what status the supplies officials should be given and whether it would be better to take the press to the arches or the arches to the press.

On the siting of the arch straightener the AUTHOR thought there were different schools of thought. Where arches were very badly distorted it was sometimes advisable that the straightener should go to the arches. Generally speaking, however, it was sufficiently easy to transport the girders to the site of the straightener where a high efficiency of straightening could be maintained.

The status of the supplies official should, without doubt, be that of an overman. The job was of sufficient importance to warrant that of overman status and in direct line management so that he reported to the manager.

MR. A. SUMMERS asked if the supplies officials should operate from the surface or underground and if a deputy should be consulted before a material budget was fixed for his district. He also wanted to know whether, in costing a particular deputy's district, salvage materials were priced. Why did the author consider it was more practical to supply a mechanized district in bulk than a hand-filled district? Mr. Summers also asked what percentage of the total material cost was it found practical to budget for, and whether the author would agree that, with experience in budgeting, a figure of 90 per cent. or more than that could be achieved.

The Deputy's Value

The supplies official was not a collar-and-tie man, replied the AUTHOR. He should spend 90 per cent. of his time in the pit and probably 10 per cent. with the storekeeper. Without doubt, the deputy must be considered, otherwise he would lose interest and that would be fatal. The deputy could either make or break a supply system of this nature. The salvaged material which entered a district was priced at the written down value plus a proportion of the labour cost of salvage. On a mechanized district there were fewer men to deal with. The supports were far more costly and it was not necessary to keep a daily supply. On a conventional district there were more men whose first thoughts were for the steel and wooden supports and this amounted to more supplies. In the past, supplies had been delivered at the beginning of the week for the whole week. and by the end of the week the supply had dwindled. It was easier to supply mechanized faces weekly because there were fewer men and less material to be handled than on a conventional face.

No concrete plan could be laid down as to the extent to which one could budget, but, expressed as a percentage of turnover in sterling, the author thought that about 2½ per cent. of the total cost could not be accounted for in the budget.

Dealing with transport on the surface, MR. A. CHAPLIN had noticed that forklift trucks seemed to be taking the place of labour in many instances, and asked if the author had any comparison in costs between mechanized and hand loading and unloading of supplies. On wire bundling of supplies he asked if comparison in cost could be made. In many mines there appeared to be quite a lot of rehandling of supplies underground which caused bottlenecks. Would it not be possible for the supply routes to be planned in the same manner as ventilation and development, and the routes to be shown on mine development plans? he asked. Work study engineers often referred to "unit loads." Mr. Chaplin asked for the author's views on "unit loads," and whether he was in favour of underground officials ordering all items as "units" instead of "numbers" as at present.

The AUTHOR could not give a direct answer to the question of forklift trucks. However, he said, it was true to say that properly used and staffed a stockyard employing a forklift truck was very efficient. He had no up-to-date information of relative costs of bundling, but method study had proved that wire bundling gave an ultimate saving in cost.

In a further question, MR. A. CHAPLIN said when commencing a scheme of material control and salvage it was important that men and officials obtained first-hand information and understood what it was about; he asked how this object would best be achieved.

Replying, the AUTHOR said it was essential that officials be given every opportunity to discuss control of materials before it was introduced. Meetings must be held first with deputies' representatives and the storekeeper, and then a general meeting of all who were to be concerned with the implementation of the scheme.

These meetings should be held sufficiently before the time intended for the introduction of the scheme to allow for general discussion between the deputies, overmen, and undermanager.

MR. L. J. MILLS said he would be interested to learn the author's views on the form of haulage which should be used to provide good transport arrangements for the salvaging operation. The gate belt should, of course, be the first item to be salvaged, but all too frequently it was left and often used as a means of transporting salvaged equipment from the district. He also asked for the underground supplies official's other duties, apart from the budgeting of supplies. It was interesting to note that as a result of method studies carried out on supplies systems, both on the surface and underground, something approaching 200 man-shifts per day had been saved in No. 7 Area of the East Midland Divisional Coal Board. On the question of handling materials underground he wondered whether the author would give his views on the line of attack that should be made.

Replying, the AUTHOR said belts should never be used in salvage work except for the transport of light supplies such as rollers, struts, lids, etc. When light stores had been salvaged, the rails should be moved to the middle of the gate and used for all other salvage. If a supplies official was of the right calibre he would be the sort of man who would look for means of improving systems of transport, supply, and ordering materials. He should be constantly on the move for greater efficiency and towards this end he should be in a position to discuss his problems with the undermanager and manager. Method study should be consulted if the problem could not be solved at the pit. The author had definite ideas about future streamlining of materials handling and had often thought about the future of a trackless tyred vehicle which could run directly from the haulage to the face. There was such a machine in use at present in Germany called the "Ruhrtahler Unicar." In the future they would see specially designed carriers into which materials would be loaded in the stockyard and transported directly to the face without transfer.

New Patents

PATENTS below are among the complete specifications accepted listed in the Official Journal (Patents). The numbers given are those under which the specifications have been printed and all subsequent proceedings will be taken.

Applications for copies of the full specifications (3s. 6d. each, post free) should be made to the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.2.

Mining and Mining Appliances

828,824 EGGEMANN, W., and CAMPENHAUSEN, VON E. [trading as SCHWARZ KOMM.-GES. H.] Props, especially pitprops.
828,771 INGERSOLL-RAND COMPANY. Rock drills.
829,404 SAARBERGWERKE. Mine face loading machines.
829,446 MASTABAR MINING EQUIPMENT COMPANY, LIMITED. Tools for inserting wire hook fasteners in transmission belts.
829,603 HOUILLERES DU BASSIN DE LORRAINE. Methods of and means for loading coal cars in coal mines.
829,786 BIENHULS, W. Mine supports.
829,810 WILD & COMPANY, LIMITED, A. G. Roof bar supports for mines.
829,896 DOMINION COAL COMPANY, LIMITED. Method and machine for mineral mining.
830,612 COOK & SONS (SHEFFIELD), LIMITED, W., and COLLINS, W. C. Mounting of wheels and axles on colliery corves or mine cars.
830,342 BECORIT GRUBENAUSBAU G.m.b.H. Mine gallery-supporting systems.
830,704 RHEINSTAHL WANHEIM G.m.b.H., formerly EISENWERK WANHEIM G.m.b.H. Mine-roof supports.
831,275 GEWERKSCHAFT EISENHÜTTE WESTFALIA. Walling support systems for mine roofs.
831,253 SKIP COMPAGNIE G.m b.H. Measuring arrangements for use in the charging or discharging of skips in mine shaft skipwinding installations.

Metallurgy and Engineering

828,764 A.R.B.E.D. ACIERIES REUNIES DE BURBACH-EICH-DUDELANGE S.A. Manufacture of steel.
829,102 NORTON & COMPANY, LIMITED, Sir, J. F. Wire-drawing machines.
828,897 POWER JETS (RESEARCH & DEVELOPMENT), LIMITED, and DIFFUSION ALLOYS, LIMITED. Method for the protection of metal articles.
829,156 FOUNDRY SERVICES, LIMITED. Casting of metals.
828,952 DEMAG A.G. Rotary tilting furnace plant.
828,842 VEREINIGTE OSTERREICHISCHE EISENUND STAHLWERKE A.G. Process and apparatus for surface hardening steel surfaces.
829,006 ARMCO INTERNATIONAL CORPORATION. Process and apparatus for smelting iron and mobile fuels.
829,120 SOUTH AFRICAN IRON & STEEL INDUSTRIAL CORPORATION, LIMITED. Supplying heat to molten metals.
828,699 ELEKTROPHYSIKALISCHE ANSTALT B. BERGHAUS. Process for the treatment of tubes of iron, steel, or iron alloys.
829,005 ARMCO INTERNATIONAL CORPORATION. Process and apparatus for reducing and smelting iron.
829,114 BABCOCK & WILCOX, LIMITED. Weld uniting of austenitic steel workpieces.
829,558 EICKHOFF MASCHINENFABRIK UND EISENGIESSEREI GEB. Support framework for articulated steel plate conveyors.
829,365 COMPAGNIE DES METAUX D'OVERPELT LOMMEL ET DE CORPHALIE. Charging of ores or the like into treatment apparatus.
829,658 UNION CARBIDE CORPORATION, formerly UNION CARBIDE & CARBON CORPORATION. Treatment of ferrous metals.
829,375 KOPPERS COMPANY INCORPORATED. Coke-oven door closure apparatus.
829,450 UNITED STATES STEEL CORPORATION. Gauge-control system for multi-stand strip mill.
829,672 GENERAL ELECTRIC COMPANY. Grain oriented sheet metal.
829,274 UNION CARBIDE CORPORATION. Process for the desulphurization of ferrous melt.
829,871 HANMADE CONVEYOR COMPANY, LIMITED. Endless belt conveyors.
829,876 EICKHOFF MASCHINENFABRIK UND EISENGIESSEREI GEB. Apparatus for driving conveyor belts.
830,173 DORTMUND-HÖRDER HÜTTENUNION A.G. Process for refining steel.
829,957 MAERTENS, L. J. Ingot moulds and continuous casting processes utilizing such moulds.
830,004 RÖCHLING'SCHE EISEN- UND STAHLWERKE G.m.b.H., formerly ADMINISTRATION-SEQUESTRE DES RÖCHLING'SCHE EISEN- UND STAHLWERKE G.m.b.H. Magnet steels with low coercive force.
830,008 UNITED STATES STEEL CORPORATION. Method of treating ores fines and product thereof.
829,807 UNIVERSAL CONVEYOR COMPANY, LIMITED. Endless belt conveyor.
830,469 LEWIS, E. M. Hot coke quenching cars.
830,258 CRITTALL MANUFACTURING COMPANY, LIMITED. Galvanizing process.
830,669 KAISER STEEL CORPORATION. Low alloy steels.
830,628 JOHNSON, MATTHEY & COMPANY, LIMITED. Grain stabilizing of metals and alloys.
830,631 VEITSCHER MAGNESITWERKE A.G. Mixers for metallurgical purposes.
830,553 LINDEMANN, W. Machines for preparing scrap metal.
830,638 HUET, A. Furnaces for heat-treating metal articles.
830,725 ATLAS COPCO A.B. Pneumatic percussion tools.
830,969 STRACHAN & HENSHAW, LIMITED. Devices for moving rail wagons or the like.
830,935 OTTO, C. Apparatus for handling coke-oven doors.
831,251 PHOENIX-RHEINROHR AKTIENGESELLSCHAFT VEREINIGTE HÜTTEN UND RÖHRENWERKE. Processes for refining phosphorus-containing pig-iron.

Fuel Treatment and Utilization

829,498 MINISTER OF POWER. Method of carbonization.
829,410 RUMMELL, R. Process of and apparatus for the gasification of fuels.
829,209 BERGWERKSVERBAND G.m.b.H., formerly BERGWERKSVERBAND ZUR VERWERTUNG VON SCHUTZRECHTEN DER KOHLENTECHNIK G.m.b.H. Coke for the manufacture of industrial carbon.
829,619 KOPPERS G.m.b.H., H. Heating of coke ovens.
830,390 STAMICARBON N.V. Furnaces for burning solid fuel.
830,968 LUMMUS COMPANY. Process for the production of coke and gaseous unsaturated hydrocarbons.

Amended Specification Published

813,982 COAL INDUSTRY (PATENTS), LIMITED. Guiding means for the driving cable or cables of cable-driven belt conveyors.

Diminishing reserves of high-grade iron ores, coinciding with mounting operating costs in the United States, have resulted in closer attention being given to the development of new ore-processing techniques. At the same time, to minimize atmospheric pollution, steps are being taken to control more closely the emission of dust and waste gases. To this end a pilot plant was built, based on an improvement of a travelling grate-rotary kiln system. The plant is described by Glenn M. Hansen, a summary of whose article in the March, 1960, issue of Blast Furnace and Steel Plant is given below.

PROCESS DATA ON RAW MATERIALS

Particular Reference to Iron Ore

DESIGN of the new plant was carried out to answer numerous process questions relating to a diversity of raw materials. Finely ground hematite and magnetite concentrates, natural iron-ore fines, magnesite, silicious bauxite, phosphate sands, coarse limestone and dolomite, and cement raw mix are some of the known materials that respond to this processing equipment.

Each of these materials, because of intrinsic chemical and physical properties, reacts somewhat differently. Balls of hematite or magnesite are fired at median temperatures of about 1,350 deg. C., while those of dolomite and magnesite must be fired at above 1,700 deg. C.

The function of a pilot plant is to provide data on which to design full-scale machinery. To reduce capital cost for a given tonnage, it is important that all components in the finished plant are precisely sized. The data are derived partly by observation, but principally by thorough pilot-plant instrumentation. In the travelling grate-rotary kiln system, these instruments consist of temperature and pressure indicators and recorders, and devices for measuring and recording solids and gas flows. Continuous analysis of gas composition, automatic proportioning equipment, and the electrical means of accurately changing and controlling the operating speed of system components make the operation efficient.

A typical raw material for processing is specular hematite concentrates, produced by flotation and assaying 60-63 per cent. Fe, about 70 per cent. of which will pass through a 325-mesh screen. The flow of material through from the plant is indicated in Fig. 1. Concentrates are brought to the wet-materials handling room and dumped into a constant-speed table feeder discharging to a conveyor, which in turn discharges into a slurry tank. Two high-speed, propeller-type mixers agitate the concentrate, and water is added in sufficient

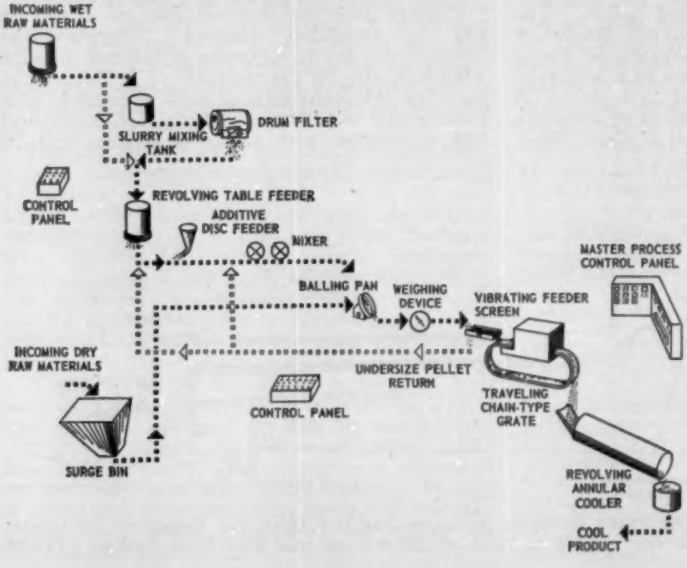


FIG. 1.—PILOT PLANT FLEXIBILITY PLUS VERSATILE CONTROL AND INSTRUMENTATION MAKES POSSIBLE GATHERING OF ACTUAL OPERATING DATA FOR EITHER WET OR DRY PROCESSES WITH A WIDE VARIETY OF RAW MATERIALS.

quantity to yield a pulp of suitable density. The slurry is raised by a pump to a drum filter tank, where the rotating filter picks up the solids, dries them, and discharges a cake containing 7 to 8 per cent. moisture. By careful control the cake moisture is held to plus or minus 0.5 per cent., of a value not exceeding 8 per cent.

Weight of Feed

The filter cake is conveyed to a specially designed table feeder mounted above a constant-speed weighing belt. A weigh cell senses the weight of feed passing over the belt and transmits a pneumatic signal to a receiver which controls the motor speed, thereby regulating the rate of table feeder discharge to the belt. The rate of feed is remotely controlled by the balling-pan operator by varying the reference pressure into the weigh cell. The weighing belt discharges to a conveyor belt bringing the specular hematite cake to the balling pan. As the cake stream passes beneath the spout of a gravametric feeder, additives such as bentonite or limestone are deposited on the cake, the rate of this gravimetric feeder being manually adjusted to discharge a correct amount of additive according to the feed rate of the coke.

An in-line mixing device, consisting of two rotating multi-bladed wheels, picks the cake and additive off the conveyor belt, violently disrupts it in a steel chamber, and lays it back on the conveyor belt.

The granular cake then enters the balling pan, a portion of the cakes forming seed pellets, the rest of it mixing with the load and supplying the fine material required to build up ball size as seed pellets progress from the interior of the pan to the discharge lip. Water is added through spray nozzles to accomplish the balling action. The speed of the pan is readily changed through a variable-speed drive controlled manually by means of a crank. Varying the pressure in a hydraulic cylinder, whose piston is attached to a swivel on the back of the pan, readily increases or decreases the slope of the pan. With control of speed, slope, and water at his command, the balling-pan operator can continuously produce a ball of required diameter and physical characteristics.

Finished green balls fall from the pan to a conveyor belt and are conveyed to the weighing belt, shown in Fig. 2, which registers the total weight of green balls fed to the travelling grate. Frequent sampling of green balls to determine moisture content facilitates later calculation of an accurate materials balance for a given test. The weighing belt discharges balls to a conveyor which is oscillated at the tail pulley, the balls being distributed uniformly across the conveyor belt and discharged to a vibrating, rod-decked screen over its full width. The screen oversize, plus ½ in., is deposited on the travelling grate to a depth of 7 in., while the undersize falls to a wide conveyor belt, discharging into a hopper. This hopper is tared on a weigh cell which transmits a pneumatic signal to a strip chart recorder on the master control panel. The weight of accumulating screen undersize is recorded on this chart.

The chain-type grate of the pilot plant conveys the balls through drying and preheat chambers, each having its own windbox. A baffle extends from the roof structure to within an inch of the 7-in. deep bed to divide the drying and preheat chambers. Gases at 980 to 1,100 deg. C. enter the preheat furnaces from the rotary kiln. A high-temperature fan (Fig. 2) draws the gases through the bed, into a hot cyclone dust collector, and then into the drying furnace. Ball temperature is reduced to about 370 deg. C. The No. 2 fan draws the gases through the drying furnace bed and exhausts them to atmosphere at about 120 deg. C.

Recordings on Master Panel

Pressure taps are inserted into each furnace and its associated windbox. Thermocouples measure the gas temperature at the exit of each wind-box, also its gas temperature at the inlet of each fan. Measurements of static pressure in each furnace and windbox, differential across furnaces and windboxes, and across a furnace and its

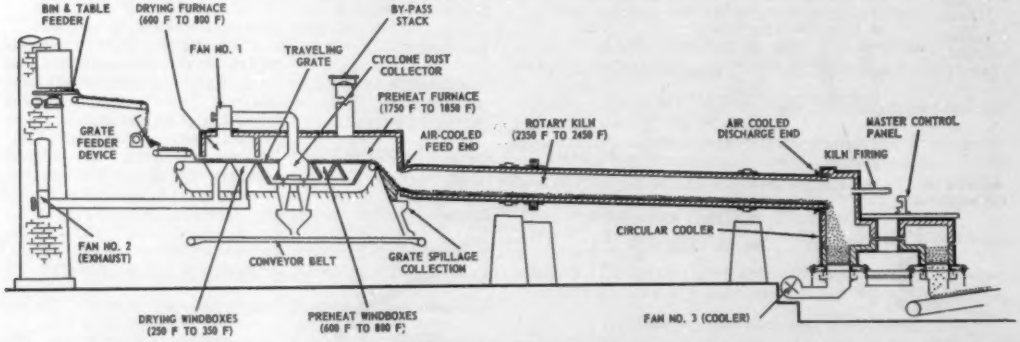

BIN & TABLE FEEDER
DRYING FURNACE (600 F TO 800 F)
BY-PASS STACK
FAN NO. 1
TRAVELING GRATE
CYCLONE DUST COLLECTOR
PREHEAT FURNACE (1750 F TO 1850 F)
GRATE FEEDER DEVICE
AIR-COOLED FEED END
ROTARY KILN (2350 F TO 2450 F)
AIR COOLED DISCHARGE END
MASTER CONTROL PANEL
KILN FIRING
CIRCULAR COOLER
FAN NO. 2 (EXHAUST)
CONVEYOR BELT
GRATE SPILLAGE COLLECTION
DRYING WINDBOXES (250 F TO 350 F)
PREHEAT WINDBOXES (600 F TO 800 F)
FAN NO. 3 (COOLER)

FIG. 2.—GRATE-KILN SYSTEM OF PILOT PLANT PROVIDES ACCURATE PROCESS DATA FOR DESIGNING FULL-SCALE COMMERCIAL PLANTS OF THE TYPE SHOWN. UNITS AS LONG AS 250 FT. ARE NOW PRODUCING CEMENT CLINKER.

respective windbox, are indicated and recorded on the master panel. The fans are controlled from the master control panel by motor-operated inlet dampers. An eddy-current coupling, remotely controlled from the control panel, is used to govern grate speed. The flow of gas in the duct between the No. 1 fan and the inlet to the drying furnace is determined by measuring the differential pressure across an orifice plate. The waste gas flow is similarly determined. These differential pressures are indicated and recorded at the master control panel. To arrive at flow in terms of standard units, it is only necessary to read the delta P and the temperature of the gas, then read the flow off graphs.

Careful control of pressures and temperatures assures that the hematite balls receive adequate heat-treatment on the grate, and also that the grate itself is not overheated. The containing walls of the grate itself are refractory lined and the grate strand is protected by the heat absorption character of the feed material. The preheated balls are directed into the rotary kiln by cascading down a refractory-lined chute at the junction between the grate housing and the kiln. A water-cooled gas sample probe is inserted into this grate discharge area. A sample of the gases leaving the kiln is extracted constantly for continuous oxygen analysis, the oxygen content being recorded on the master control panel.

Temperature of Kiln Bed

The balls proceed down the length of the small pilot kiln and are heated according to the temperature gradient from the feed end to the discharge end. The kiln is pitched at ¾-in. slope. Retention time in the kiln is a function of feed rate and kiln speed, as the loading is held constant at about 7 per cent. At the hot, or discharge, end the temperature of the kiln bed is measured by focusing a radiation pyrometer on the hottest area, this temperature being transmitted to an instrument on the master control panel and recorded on a circular chart.

The kiln discharge end is enclosed by the firing hood through which extends the kiln burner, using a mixture of air and propane gas. Primary air fed to the burner and propane gas are metered through rotameters. The hot pellet discharge from the kiln falls into an annular, refractory-lined cooler to a bed depth of from 20 to 30 in. The cooler is rotated over multiple windboxes and air is introduced into a circumferential manifold and directed to vertical ducts that exhaust into the respective windboxes.

A portion of the cooling air is raised to high temperatures by extracting heat from the pellets and is introduced into the kiln to augment the primary air supply as well as to return useful heat to the process. The remainder is exhausted up the cooler stack after orifice metering. Product is discharged from the cooler through a vibrating feeder which feeds a conveyor belt, taking the finished pellets to storage.

BIG-END-DOWN MOULDS FOR STAINLESS STEELS

IN place of big-end-up ingot moulds with brick hot-tops to minimize piping in stainless steel ingots, the Brackenridge (Pa.) Works of the Allegheny Ludlum Steel Corporation is now employing big-end-down moulds with exothermic sideboards, the conventional hot-tops being eliminated.

The sideboards are made of exothermic powder and a binder developed by the Pittsburgh Metals Purifying Company, the principal ingredients being a nitrate, ferric oxide, and aluminium. As the sideboards together with hot-tops proved too expensive, the latter were discarded and only the sideboards employed. However, tests proved that two boards were nearly as effective as four with a fifth on top of the mould.

The boards are 2 in. thick, 10 in. wide, and 42 in. long, suspended from the four inner walls of an 8-ton ingot mould.. As the hot metal rises, the sideboards are gradually immersed. They ignite and impart heat to the ingot.

Results of Inspection

The first ingot cast was rolled into a slab and ground smooth. Ultrasonic inspection revealed no pipe or other discontinuities. Since then more than 40 ingots of stainless steel have been poured, rolled, and examined, results being uniformly good. Regarding costs, the sideboards for an 8-ton ingot mould cost $12 a set, or $1.50 per ton of steel. Plain brick hot tops for the same size ingot are $9.20 each, or $1.15 a ton. For 5-ton ingots, sideboards are $1.50 a ton and hot tops $1.35. Several factors more than offset the slightly higher costs of exothermic materials. Thus, mould life is increased because the moulds, being bottomless, are poured in cast-iron stools which are eroded to some extent, but being separate from the moulds repairs are facilitated.

Over a period of several months, average mould cost per ton of steel was 43 per cent. lower on 8-ton big-end-down moulds than on big-end-up moulds. The 5-ton big-end-down moulds were 25 per cent. less expensive than their big-end-up counterparts. Because big-end-down ingots can be stripped faster, less time and heat are lost between casting and movement to the soaking pit.

UK Factory for Johns-Manville

British subsidiary of the Johns-Manville Corporation, of New York, Johns-Manville (United Kingdom), Limited, opened the first wholly owned J-M plant in the UK on April 22. It is at Hessle, Haltemprice, near Hull (Yorks), that area being selected to facilitate easy distribution in the UK and for exporting to the Continent. The Johns-Manville organization is primarily engaged in manufacturing and marketing asbestos and fibreglass products, thermal insulations, building materials, packings and gaskets, brake linings, and Celite products.

New Range of Centrifugal Pumps

AFTER two years' design and development work Pegson, Limited, Coalville (Leics), announces the introduction of a new range of centrifugal pumps. The new pump, called the Pegson-Sultan, is a vertically split, end suction, single stage, centrifugal pump. It is being produced in sizes from 1½ in. to 12 in. suction branch diameter, the entire range comprising 42 pumps with capacities from 20 to 3,500 gal./min.

Basically, there are six sets of constant hydraulic shapes around which all Pegson-Sultan pumps are designed. Each set of shapes produces a uniform performance pattern so that a 12-in. pump, for example, is a geometric enlargement of any other model in the same hydraulic group. By keeping the suction eye constant for all pumps of the same suction branch diameter it has been possible to reduce the number of parts and increase interchangeability. Furthermore, the horsepower range —from ¼ to 75—is covered by five bearing housing groups and, within each group, all shafts, seals, bearings, caps, keys, and holding-down bolt locations are common.

The mathematical progression of pumps in the range makes it possible, for example, to select any pump and, with a full diameter impeller, it is always operating within 6 per cent. of peak efficiency and, with a minimum diameter impeller, within 9 per cent. A stable head-quantity characteristic is also a feature of the pumps, enabling them to be used satisfactorily in parallel or on booster applications.

A contemporary styled bearing housing in which the mounting flange is rigidly supported at both the top and bottom is a new feature of the design. The top support is a T-beam of considerable strength, while the bottom support, equally robust, forms a drain bowl to collect gland leakage if a stuffing box is used. The low sides of the drain bowl, permissible because of the strength of the T-beam, give easy access for spanners when tightening the stuffing box; this is particularly beneficial when a pump discharge branch is mounted horizontally.

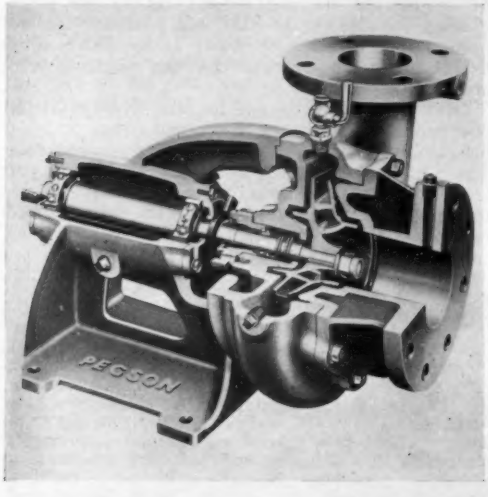


FIG. 1.—SECTION THROUGH THE NEW SULTAN PUMP.

The shaft, of generous proportions for all loading conditions, is designed so that the span between the two bearings is always greater than the length of the cantilever from the impeller centre line to the first bearing, giving a low bending moment and reducing shaft deflection to a minimum. Deep-groove ball bearings are used throughout for smooth operation and long life. Bearing life is further increased by the balance chamber behind the impeller, which minimizes any hydraulic axial thrust.

A choice of four interchangeable seals is available, comprising three mechanical self-lubricating shaft seals and a conventional stuffing box with gland packing. These seals are suitable for a very wide variety of liquids and all can be arranged for internal or external liquid circulation. Pump design allows seal changeovers to be made without any alteration to existing pump components.

All pumps are available with engines or electric motors and direct coupling, flexible coupling, or belt drive can be arranged. Standard pump construction can be in iron, bronze, iron with bronze trim, or stainless steel; other materials will be considered for special applications.

Colliery Accidents

FATALITIES caused by accidents at mines under the Mines and Quarries Act, 1954, in the first quarter of 1960 totalled 72, compared with 74 in the last quarter of 1959 and 105 in the first quarter of 1959. The number of persons seriously injured was 441, compared with 437 in the last quarter of 1959 and 417 in the first quarter of 1959. Details are given in the following table:—

	Number of persons killed during the 13 weeks ended:		Number of persons seriously injured during the 13 weeks ended:	
	April 4, 1959.	April 2, 1960.	April 4, 1959.	April 2, 1960.
Underground—				
Explosions of firedamp or coal dust	2	—	2	—
Falls of ground ..	46	41	193	174
Haulage	31	15	114	123
Miscellaneous (including shaft accidents) ..	19	7	67	84
Total	98	63	376	381
Surface—				
All causes	7	9	41	60
Total Underground and Surface	105	72	417	441

Accidents in Coal Mines

REPORT ON NORTH EASTERN DIVISION

AT the end of 1959, a total of 128 coal mines was working in the North-Eastern Division of the NCB. Output of saleable coal was 42,251,218 tons, a fall of 472,925 tons compared with the previous year, states Mr. H. J. Perrins, HM Divisional Inspector, North Eastern Division, in his report under the Mines and Quarries Act, 1954 (Stationery Office, price 3s. 6d.). The total number of persons employed at the year-end was 128,082, a decrease of 7,935 compared with 1958.

Regarding accidents, Table 1 is a summary of all persons killed or seriously injured during the year, giving the average for the preceding three-year period for comparison. The number of persons killed in coal mines totalled 68, against 43 for the previous year, and compares with an average of 55.7 for the preceding three-year period. The number seriously injured was 281, against 318 for the previous year, and compares with an average of 318.6 for the preceding three-year period. The number of persons killed was 25 more than in the previous year, and the highest recorded since 1949. The deaths underground, at 62, were 24 more than those for the previous year and the highest since 1947.

The high total of fatal accidents underlines the warning given in the report for 1958 against complacency as a result of fatalities in that year being the lowest total ever. There were no fatalities among young persons, although 127 were seriously injured.

Falls of Ground

The increase in the number of persons killed by falls of ground, from 19 in 1958 to 33 in 1959, is most perturbing, states the inspector, the total amounting to just under one-quarter of the total for the whole country. Almost one-half of all the accidents reported, fatal and seriously injured, the latter being 121 and 120 in 1959 and 1958, respectively, occurred due to neglect or default by the person involved arising from a lack of effective supervision or personal awareness. Twenty-six persons were killed and 102 seriously injured on longwall faces, two were killed and eight seriously injured in narrow work, and five were killed and 11 seriously injured by falls on roads. An analysis of the provision or condition of the supports concerned in each accident showed that 10 persons were killed and 62 seriously injured in ground which was unsupported, two were killed and 18 seriously injured by falls which took place between supports, three were killed and three seriously injured due to broken supports, 14 were killed and 28 seriously injured because the supports were otherwise ineffective and four were killed and 10 seriously injured during support withdrawal operations.

TABLE 1.—*Persons Killed or Seriously Injured in Coal Mines During 1959, Compared with the Average for 1956-58.*

Classification of accidents.	Killed.		Seriously injured.	
	1959.	Average 1956-58.	1959.	Average 1956-58.
Falls of ground:				
(*a*) At the face	28	20.0	110	113.3
(*b*) On the roads ..	5	2.7	11	11.0
Haulage and transport ..	9	14.0	66	84.7
Gases, coal dust, and fires:				
(*a*) Explosions	10	2.3	2	4.7
(*b*) Others	—	0.3	—	—
Machinery	3	1.0	17	17.0
By explosives	1	1.0	6	4.0
Other underground accidents	1	3.4	33	34.6
In shafts	5	3.7	4	11.3
Surface accidents	6	7.3	32	38.0
Total	68	55.7	281	318.6

There were 17 killed and 80 seriously injured in faceworkings, representing a marked and serious increase when compared with the previous year in which six persons were killed and 74 seriously injured; the increase was mainly due to falls of roof. Fifteen persons were killed and 41 were seriously injured by falls of roof in faceworkings. These compare with four killed and 44 seriously injured in 1958. Six fatalities occurred at roadheads and 25 persons were seriously injured, the corresponding figures for the previous year being six and 24, respectively. Five persons were killed and five seriously injured in wastes, while on roads five were killed and 11 seriously injured.

Seven persons were killed and 39 seriously injured in accidents by mechanical haulage—an increase on the previous year when four were killed and 31 seriously injured. Six persons were killed and 13 seriously injured in accidents involving locomotive haulage, an increase over those for the previous year of three and 11, respectively. The increase in these accidents was not proportionate to the additional locomotives commissioned and an analysis of them shows that they were due either to carelessness or even recklessness in some cases or to a decline or failure to provide the necessary operational standards. No persons were killed, but 13 were seriously injured in accidents involving conveyors, this figure comparing favourably with three killed and 24 seriously injured in 1958.

Referring to mechanical coal faces, the inspector states that the use of self-advancing supports on

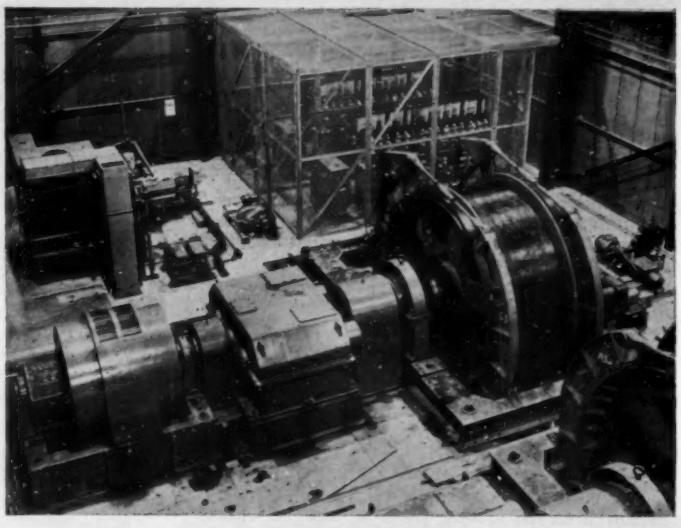
power-loader faces increased and at the end of the year there were seven installations in use, three others having been discontinued because of difficult operational conditions. Experience has shown that where the roof and floor conditions are strong enough to allow for the frequent setting and withdrawal of the supports little difficulty is encountered with them. However, it was where these conditions were not available, and disintegration of the strata consequently took place that difficulties followed which led to the discontinuance of the system in the three cases mentioned. In one of them the self-advancing supports were installed to allow for the operation of a coal plough on a face in a seam 2 ft. 6 in. thick previously worked by normal longwall methods. The roof consisted of 10 in. of fairly strong clunch followed by a 4-in. band of coal and then medium-strength shales; the floor was a weak fireclay. After three or four weeks roof conditions began to deteriorate, cantilever bars bent in increasing numbers, and falls of roof became increasingly frequent. This instance, and other unsuccessful attempts to use self-advancing supports, appear to indicate that their success depends largely on the strength of the roof and floor. It is desirable that the roof, despite high-pressure settling loads, should remain relatively unbroken for a distance of about 9 ft. back from the face and then be suitable for caving in the waste, as strip packing is generally impracticable.

DUAL-PURPOSE WINDERS AT YORKSHIRE PIT

FOUR dual-purpose, tower-mounted mine winders have been supplied by the heavy plant division of Associated Electrical Industries, Limited, for Kellingley Colliery (Yorks). Two of them, each driven through a co-axial reduction gearbox by a 1,100-h.p. a.c. motor, are in use in No. 1 tower at the colliery.

These multirope friction winders are the first in Britain to be mounted in a tower and used as drum winders for sinking a shaft. No. 1 shaft at Kellingley will eventually be 2,400 ft. deep. When coal production begins, they will be employed as four-rope friction winders, with push-button control.

Two other winders, twice as powerful, have been installed in No. 2 tower. These, too, will be used both for shaft sinking and for raising coal. Each of these winders will be driven through a twin-input gearbox by two motors of the same rating as those in No. 1 tower. On all four winders the AEI system of dynamic braking is used, so that the mechanical brakes are needed only to bring the cage to rest. Power is supplied to the motors directly at 11 kV.



ONE OF THE AEI 1,100-H.P. A.C. WINDERS IN NO. 1 TOWER AT KELLINGLEY COLLIERY (YORKS).

The depth indicator on each driver's desk houses selsyn receivers powered by similar transmitters driven by the drum. A simple three-core cable provides the connection. The accuracy and safety of this method compare favourably with that of a long-shaft drive, which may be difficult to install and maintain in the rather confined accommodation of a tower-mounted winder. As a precaution against the possibility that cable faults might produce misleading information on the indicator, a special protective system was developed, so that an error on the indicator automatically results in the shutting down of the winder.

Mechanical parts of the winders were supplied by M. B. Wild & Company, Limited, Birmingham.

BICC Group Blends its Selling Force

CABLE production facilities and marketing arrangements have been reorganized by British Insulated Callender's Cables, Limited, because of changes in the structure of the electric cable making industry. From next Wednesday, the home sales forces of companies in the group concerned with the sale of cables and insulated rubber or thermoplastics, will combine with the BICC home sales organization to sell a standard product on a standard drum.

Additional BICC depots are being established in Bradford, Dudley, and Portsmouth.

TWO STEEL CONFERENCES

Meetings at Harrogate and Glasgow

Two important steelmaking conferences have been held recently. At Harrogate, where the 54th BISRA Steelmaking Conference was held on May 11 and 12 under the chairmanship of Mr. J. S. Curphey (Dorman Long (Steel), Limited), with Dr. J. H. Chesters (United Steel Companies, Limited) as vice-chairman, the subject was "The All-Basic Open-Hearth Furnace." An exclusive report of the conference will appear in subsequent issues.

The second conference, held in Glasgow on May 13 and organized by the West of Scotland Iron and Steel Institute, was concerned with "Internal Defects in Steel."

THE ALL-BASIC OPEN-HEARTH FURNACE

A FEW years ago the number of all-basic open-hearth furnaces operating in this country could be counted on the fingers of one hand, but today there are over 50 such furnaces and a similar rate of increase in the use of all-basic construction for open-hearths has occurred in the United States. Even on the Continent and in Russia, where the all-basic open-hearth furnace established itself earlier because the price difference between silica and basic brick was less adverse, there has been a further move towards use of all-basic construction.

It was this sudden upsurge of interest that prompted the All-Basic Furnace Sub-committee (a joint committee of B. Cerma, R.A. and BISRA) to make "The All-Basic Open-Hearth Furnace" the subject of the 54th BISRA Steelmaking Conference. The conference attendance was a record, there being 190 delegates, including several from abroad. The papers and discussions at the three sessions proved stimulating.

Papers at Harrogate

Titles and authors of the papers were:—

SESSION ON "BASIC ROOF CONSTRUCTION."—"Design of Basic Roofs for Open-hearth Furnaces." by Dr. W. A. Archibald; "Arch Stresses: Test-rig Data," by J. R. Lakin; "Arch Stresses: Production Furnace Trials," by W. M. Fern; "Effect of Roof Construction on Roof Life: USA Experience," by W. S. Debenham; "Effect of Roof Construction on Roof Life: Rigid *versus* Sprung Construction at Steel, Peech & Tozer," by H. H. England; "Effect of Roof Construction on Roof Life: Detrick *versus* Continental at the Royal Netherlands Blast Furnaces & Steelworks, Limited," by P. W. A. Lanzing.

SESSION ON "PROPERTIES OF BASIC ROOF BRICKS."—"Basic Bricks for Open-hearth Furnace Roofs," by H. M. Richardson; "Effect of Brick Quality on Performance: British Experience," by J. Mackenzie; "Effect of Brick Quality on Performance: USA Experience," by W. S. Debenham.

SESSION ON ALL-BASIC FURNACE OPERATION.—"Potentialities of Faster Driving with Particular Reference to Operating Costs," by Dr. A. H. Leckie; "Performance of the Maerz-Boelens Furnace," by Dr. Ing. H. J. Därmann; "Fast Driving in Relation to Thermal Efficiency and Roof Wear at Steel, Peech & Tozer," by H. H. England and C. Holden; "Performance of the Ajax Furnace," by A. Jackson.

INTERNAL DEFECTS IN STEEL

Twelve visitors from abroad were present at the all-day conference on "Internal Defects in Steel" held by the West of Scotland Iron and Steel Institute. They came from Belgium, Finland, Germany, Holland, Italy, Norway, and Sweden; the total attendance of 160 was a record.

The eight papers, detailed below, were in themselves a veritable symposium on the subject and much interesting information emerged during the lively discussions between steelmakers, steel fabricators, steel inspectors, and instrument manufacturers. Abstracts of the papers will be published in subsequent issues of IRON AND COAL. The full papers and discussions will be available in due course from the West of Scotland Iron and Steel Institute.

The following papers were presented:—

"Some Service Experience and Inspection Considerations," by G. P. Smedley (Lloyd's Register of Shipping, London); "Methods of Assessing Internal Quality of Steel Tubes and Welds," by Dr. J. S. Blair (Stewarts and Lloyds, Limited, Corby); "The Importance of Internal Quality in Welding," by I. G. Hamilton (Babcock & Wilcox, Limited, Renfrew); "The Significance of Defects in Relation to Users, with Particular Reference to Castings and Forgings," by F. Buckley (English Electric Company, Limited, Rugby); "Internal Defects in Plates," by J. E. Roberts (Colvilles, Limited, Motherwell); "Internal Defects in Steel Castings," by Dr. J. Cameron and J. Courtney (Clyde Alloy Steel Company, Limited, Motherwell); "Internal Defects in Large Castings and Large Forgings," by J. M. Mowat and P. Packham (Wm. Beardmore & Company, Limited, Glasgow); "Internal Quality of Steel," by Dr. V. Scalesi (Società Italiana Acciaierie Cornigliano, Genoa).

Pig-iron and Steel Production

STATISTICAL SUMMARY

IN the following United Kingdom pig-iron and steel statistics, issued jointly by the Iron and Steel Board and the British Iron and Steel Federation, Table 1 gives the production of pig-iron and ferro-alloys and the number of furnaces in blast in March. Table 2 gives the production of steel ingots and castings in March and Table 3 gives details of deliveries of finished steel in February last. Activities of the industry are summarized in Table 4.

TABLE 1.—*Average Weekly Production of Pig-iron and Ferro-alloys in March, 1960.* (*Thousands of Tons.*)

District.	Furnaces in blast.	Hematite.	Basic.	Foundry.	Forge.	Ferro-alloys.	Total
Derbys., Leics., Notts., Northants, and Essex	21	—	29.7	21.7	0.1	—	51.5
Lancs. (excl. N.W. Coast), Denbigh, Flints. and Ches. / Yorkshire (excl. N.E. Coast and Sheffield)	7	—	24.2	—	—	1.5	25.7
Lincolnshire	10	—	47.3	—	—	—	47.3
North-East Coast	17	2.0	62.3	—	—	1.0	65.3
Scotland	6	0.6	23.7	1.0	—	—	25.3
Staffs., Shrops., Worcs., and Warwicks.	5	—	6.0	1.1	—	—	7.1
S. Wales and Monmouthshire	11	3.8	60.5	—	—	—	64.3
Sheffield	2	—	3.5	—	—	—	3.5
North-West Coast	8	19.6	—	1.1	—	1.6	22.3
Total	87	26.0	257.2	24.9	0.1	4.1	312.3*
February, 1960	83	21.7	249.0	28.7	—	2.1	301.5
March, 1959*	80	17.6	181.8	18.5	0.3	3.0	221.2

TABLE 3.—*Average Weekly Deliveries of New Non-alloy and Alloy Finished Steel.* (*Thousands of Tons.*)

Product.	1958.	1959.	1960. Feb.	1960. Jan.	1960. Feb.
Non-alloy steel:					
Ingots, blooms, billets, and slabs‡	4.6	5.1	4.3	5.6	5.3
Heavy rails	10.2	6.8	8.2	6.9	8.8
Sleepers	1.2	0.6	1.0	0.5	0.3
Fishplates and sole-plates	0.7	0.4	0.5	0.4	0.6
Plates:					
(i) Over ⅜ in.	29.6	24.8	27.4	29.2	31.4
(ii) Under ⅜ in.	17.7	18.3	18.0	20.0	22.3
Other heavy prod.	41.8	41.2	35.1	54.7	56.0
Ferro-concrete bars	7.6	9.6	6.6	12.1	13.4
Wire rods	21.5	23.5	22.3	29.4	28.9
Arches, etc.	8.6	7.8	8.6	7.7	8.5
Other light sections	29.1	33.0	30.4	42.0	44.5
Bright steel bars	6.2	7.6	7.0	9.7	10.4
Hot-rolled strip	22.6	27.4	27.2	34.9	36.2
Cold-rolled strip	7.0	8.0	7.7	10.0	10.6
Sheets, incl. coated					
(i) Hot rolled	10.6	11.8	10.4	12.4	14.2
(ii) Cold reduced	31.1	35.2	34.2	39.8	41.3
Tinplate:					
(i) Hot dipped	8.4	7.7	7.3	7.5	10.2
(ii) Electrolytic	10.3	13.2	13.9	15.2	15.9
Blackplate	0.8	0.7	0.8	0.7	0.9
Tubes up to 16 in.	19.0	20.6	18.7	25.7	25.0
Tube fittings, etc.	0.4	0.4	0.4	0.4	0.4
Tyres, wheels, and axles	4.5	2.4	2.9	2.7	2.2
Forgings (excl. drop)	2.6	2.1	2.2	2.1	2.2
Steel castings	4.2	3.6	3.7	4.2	4.5
Tool steel	0.2	0.2	0.2	0.3	0.2
Total	300.5	312.0	299.0	374.1	394.2
Alloy steel	16.1	18.2	17.3	23.0	23.8
Total deliveries from U.K. production†	316.6	330.2	316.3	397.1	418.0
Add: Imported finished steel	7.0	7.1	4.5	12.1	15.6
	323.6	337.3	320.8	409.2	433.6
Deduct: Intra-industry conversion§	41.2	47.6	45.9	57.1	60.1
Total new material	282.4	289.7	274.9	352.1	373.5

† Includes finished steel made from imported ingots and semis.
‡ Other than for conversion into any other form of steel listed.
§ Material for conversion into other products also listed in this table.

TABLE 2.—*Weekly Average Production of Steel Ingots and Castings in March, 1960.* (*Thousands of Tons.*)

District.	Open-hearth. Acid.	Open-hearth. Basic.	Bessemer.	Electric.	All other.	Total. Ingots	Total. Castings.	Total ingots and castings.
Derbys, Leics, Notts, Northants, and Essex	—	4.8	16.1 (basic)	2.8	0.1	22.3	1.5	23.8
Lancs. (excl. N.-W. Coast), Denbighs, Flints, and Cheshire / Yorkshire (excl. N.-E. Coast and Sheffield)	1.2	41.6	—	5.3	0.3	47.0	1.4	48.4
Lincolnshire	—	50.2	—	—	0.1	50.2	0.1	50.3
North-East Coast	1.0	90.9	—	1.5	0.4	91.9	1.9	93.8
Scotland	1.2	48.7	—	4.0	0.1	51.8	2.2	54.0
Staffs, Shrops, Worcs, and Warwicks	—	23.2	—	4.6	0.8	26.6	2.0	28.6
South Wales and Monmouthshire	2.3	96.0	17.4 (basic)	0.9	0.1	116.2	0.5	116.7
Sheffield (incl. small quantity in Manchester)	8.1	39.2	—	15.1	0.4	60.7	2.1	62.8
North-West Coast	—	—	5.8 (acid)	0.9	—	6.6	0.1	6.7
Total	13.8	394.6	39.3	35.1	2.3	473.3	11.8	485.1*
February, 1960	14.1	392.1	39.5	34.3	2.2	470.4	11.8	482.2
March, 1959*	11.4	303.3	23.6	22.5	1.9	353.4	9.3	362.7

TABLE 4.—*Iron and Steel Price Index and General Summary of Pig-iron and Steel Production.* (*Weekly Average in Thousands of Tons.*)

Period.	B.o.T. Price Index, 1938 + 100. Iron and steel.	Coal.	Basic materials.§	Iron-ore output.	Imported ore used.	Coke sent to blast-furnaces.	Pig-iron, ferro-alloys prod.	Scrap used in steel prod.	Steel (incl. alloy). Imports.†	Prod. ingots, castings.	Delivrs. finished steel.	Stocks.‡
1957	328	488	537	325	303	270	275	220	14	417	322	2,580
1958	343	403	478	276	262	227	245	196	9	369	284	2,242
1959	340	497	477	286	244	210	242	208	7	388	291	2,244
1960—Feb.	338	503	486	333	320	256	302	250	15	482	375	2,267
Mch.*	337	502	484	347	325	262	312	256	19	485	375	2,236

* Months contain five weeks, all tables.
† Weekly average of calendar month.
‡ Stocks, ingots, semi-finished and finished steel, at the end of the years and months shown.
§ Used in non-food manufacturing industries.

New Equipment and Products

Self-trimming Grab

DESIGNED completely to obviate hand-trimming when used to unload railway wagons, a grab is now being manufactured by Michael & Partners, Limited, Chesterfield. First developed for use on the company's own civil engineering operations, this self-trimming grab (Fig. 1) proved so successful that it was decided to manufacture it for sale with capacities of up to 3 cub. yd. The 1½-cub. yd. model has been specifically designed for unloading British Railways' standard steel wagons, rendering the use of cleaning doors unnecessary. It is completely free from projections in the open position and able to reach into all square corners.

When the grab is fully open the jaws are vertically parallel and measure 7 ft. 11¼ in. across so that they can slide exactly down the 7 ft. 11½ in. inside width of a steel wagon. Although wooden trucks are a few inches narrower, the grab jaws remain outermost even when partly closed, the same performance thus being achieved as with the steel wagons.

Essentially it is a digging grab. Owing to the receding radius of its jaws, the grab tends to pull itself into the stock so that it digs throughout the closing stroke and lifts a full load every time. The jaws are geared together to give consistent, smooth closing. Two of these 1½-cub. yd. self-trimming grabs have been regularly unloading 140 tons of small coal in an hour. This rate is equivalent to that of a tippling unit costing about 20 times as much as the two grabs.

Although the grabs must be used with cranes, these are generally present on any site and are multipurpose. The capital cost of cranes need not, therefore, be considered when comparing the use of two grabs with the use of one single-purpose tippling unit. One grab will completely empty 14 tons of slack coal from a steel railway wagon in 15 to 18 bites. The jaws of the grabs are bevelled and hard faced and this, together with the door design, makes it unnecessary to crash drop the grab into the stock. It is able to cut straight into the stock under its own weight without any added momentum. This is a particular advantage when unloading coal as degradation is minimized.

Run-of-mine coal and large run-of-oven coke have been unloaded satisfactorily with less than 5 per cent. crushing. The grabs are made from mild steel in light, medium, and heavy weight types with capacities from ½ cub. yd. to 3 cub. yd., and the self-trimming aspect applies to the whole range. Alloy steel link and trunnion pins are used in conjunction with hardened steel bushes. None of the pins protrudes beyond the bucket faces and they are all fitted with recessed high-pressure grease nipples.

The hardened steel pulleys run on roller bearings and are very quickly released for revving up or alteration of revving which is available in ratios of 2:1, 4:1, or 5:1. The rope anchors are easily accessible and are of the wedge and socket type.

As well as handling coal and coke, these self-trimming grabs have proved efficient in unloading iron ore, rock phosphates, limestone, and many other heavy bulk materials.

Valve-lapping Machine

REMOVAL of a valve from a pipeline, in order to lap the seat faces, involves time and expense. The practice in high-pressure steam installations of welding valves into the pipeline has made it essential that seat faces be lapped without removing the valve from the system. For this work the Dewrance-Croft lapping machine has been specially designed to lap in one operation both seat faces of parallel slide and wedge valves of any make. The machines are made in three sizes to cover a wide range of valves.

As shown in Fig. 2, the driving mechanism is located on a supporting chassis and, in service, the unit is mounted on an adaptor plate clamped to the valve body cover flange. The stroke of the pendulum A supporting the lapping head B is adjustable at the lower pivot C located on the vertical slide D. A further adjustment is also provided by the eccentric bush E inserted in the driving head F, and the combination of the two enables the maximum throw to be obtained within the body without touching the sides. Locking screw G in the top pivot H gives the adjustment required to suit the various depths of bodies. The driving head F provides the lapping motion.

The machine illustrated is manually operated through a direct drive for larger valves and through a 2 to 1 gearing for smaller valves, during which a cam operates hydraulic plunger pump J to provide the pressure to force the laps against the seat faces. The pressure is

FIG. 1.—LEFT: THE GRAB SLIDES EXACTLY DOWN THE INSIDE WIDTH OF A STANDARD STEEL WAGON; CENTRE: THE GRAB LIFTS A FULL LOAD EVERY TIME; RIGHT: THE UNLOADED WAGON HAS BEEN COMPLETELY TRIMMED WITHOUT ANY MANUAL LABOUR.

initially produced by partially screwing up the regulator in the relief valve K, in the hydraulic system, and the handwheel given a few turns. The application of pressure automatically aligns the lapping discs with both seat faces. The machine is suitable for lapping valves with seat bores of ¼ in. to 2 in. inclusive. In

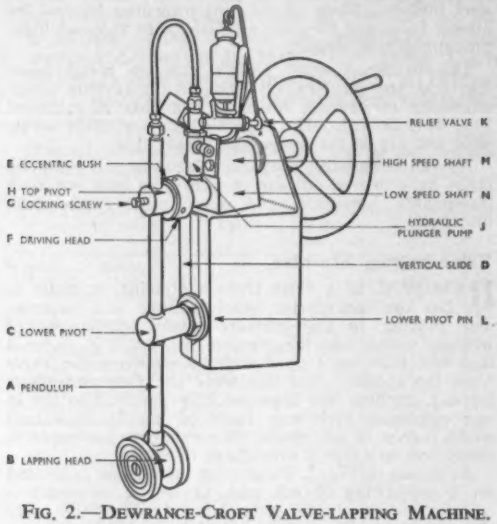


FIG. 2.—DEWRANCE-CROFT VALVE-LAPPING MACHINE.

a duplicate model the lapping is pressurized by compressed air instead of the self-contained hydraulic system, and requires an air supply of 25 lb./sq. in. A larger power-operated model will lap seat bores from 2½ in. to 8 in., while a still larger machine laps valves with seat bores ranging from 9 in. to 14 in.

All machines are supplied with sets of cast-iron lapping plates and steel rams to suit the bore of seats appropriate to the range of valve sizes for each machine. Electrically-driven machines are supplied with the starter separate from the machine to enable it to be installed in a vertical position. The lapping machines are manufactured by Dewrance & Company, Limited, Great Dover Street, London, S.E.1.

Vertical Reciprocating Compressors

DESIGNATED Type 300/A, a new standard range of vertical reciprocating compressors is now being produced by the Bryan Donkin Company, Limited, Chesterfield, to replace its earlier range of reciprocating compressors. Rationalization of the design, and the introduction of new production methods, has enabled the capital cost of the compressors to be considerably reduced, while, at the same time, the operating efficiencies have been increased. Units are available with 6-in., 8-in., or 12-in. stroke.

The 6-in. stroke compressor can be supplied as a single-, two-, or three-crank machine, and the 8-in. and 12-in. stroke machines are made with either two or three cranks. The maximum flow of free air obtainable with the 12-in. stroke compressor at a discharge pressure of 100 p.s.i.g. is about 3,600 cub. ft. a minute.

Dropforged connecting rods have been used in accordance with modern practice. These are made in I-section and have a high strength/weight ratio. The use of dropforged connecting rods, as well as reducing production costs, also leads to a reduction of the out-of-balance forces.

The cylinder has the suction and delivery valves vertically disposed around the cylinder walls. By this means accessibility has been very much improved and the removal of any valve gives direct access to the cylinder and piston for inspection. Long life of the bearings is made possible by the provision of a centrifugal oil cleaner, which is built into the lubricating oil system and is driven by oil pressure. This cleaner removes all particles larger than five microns, thus eliminating all the abrasive matter that is most detri-

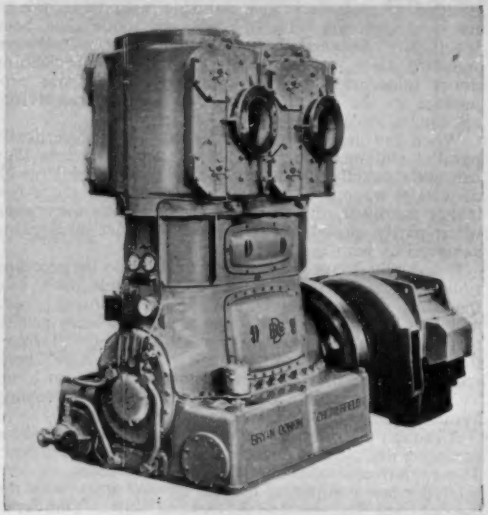


FIG. 3.—THE 12-IN., TWO CRANK VERTICAL RECIPROCATING COMPRESSOR.

mental to bearing surfaces. A water-cooled oil cooler has been incorporated in the base plate.

The cylinder gland has been fitted with a seep-off pipe to the low-pressure side of the compressor to prevent escape of toxic gases to atmosphere or ingress of air during the suction stroke.

These compressors are completely dust and weather proof.

New Range of Traction Battery Chargers

INTRODUCED at the recent Mechanical Handling Exhibition in London was a new range of battery chargers manufactured by Oldham & Son, Limited, Denton, Manchester. Hitherto, traction batteries and charging equipment have generally been supplied by two different firms, giving the user an immediate problem of what type of charger is best suited to the particular battery in use. As an answer to this problem, Oldham & Son has produced a range of battery chargers designed to maintain peak performance from traction batteries.

Taper and two-stage chargers are available to meet the requirements of BS 2550. Single-phase mains voltage is fed to a vacuum-impregnated transformer with six primary tappings. The transformer is double wound with an earth screen and is conversely rated.

FIG. 4.—TRACTION BATTERY CHARGER FOR MECHANICAL HANDLING EQUIPMENT.

Germanium rectifiers have been chosen as having the best characteristics and provide complete reliability; a.c. protection is by a high-speed circuit breaker and d.c. protection is by high-speed fuse. The charge is terminated in both taper and two-stage version by a relay, which. in the two-stage model, is also used to operate the contactor for changing the charging rate.

The cubicle framework (Fig. 4) is of extruded aluminium and the panels of heavy-gauge sheet metal are finished in acid-resistant paint. All controls are recessed for protection against accidental damage. The chargers are simple to operate, it being necessary only to plug in, reset the relay, and switch on; regulation and termination of the charge are both automatic.

Delivered together, the batteries and the charger will be serviced by the same engineer, maintenance of P.g. traction batteries, already supplied, being extended to cover the chargers.

100-ton Wide-ram Press

AN addition has been made to the range of wide-ram presses built by B. & S. Massey, Limited, Openshaw, Manchester. These are designed for preforming and finishing dropforgings in addition to the usual trimming operations. The presses are made in sizes from 100 tons to 1,000 tons with table working areas in the smaller size 46 in. by 30 in. to a maximum of 84 in. by 50 in. Each press is provided with four one-piece cast-steel pitmans, ensuring maximum resistance to ram tilting. Fig. 5 shows the 100-ton press.

All bearings are of generous proportions and the clutch is of the direct, air-operated, friction type as provided on the firm's high-speed forging presses and tiebolt trimming presses. The lubrication unit is automatically interlocked with the main press drive so that when the press is in operation adequate lubrication is provided for all moving parts.

Alloy steel double helical gears provide the transmission and the frame, which comprises bedplate, uprights, and crown, is of the box type, welded steel construction for maximum strength, the whole frame structure being held together by four large diameter steel bolts which are shrunk into position.

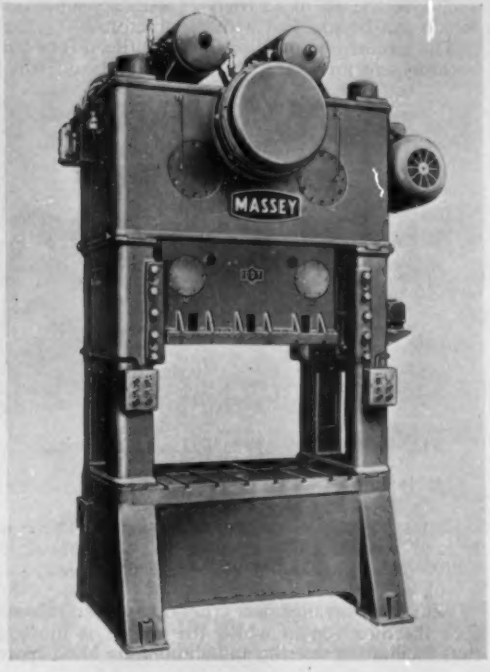


FIG. 5.—100-TON WIDE-RAM PRESS.

New Coal Cleaning Plant in the USSR

NEW equipment for the automatic control of low-grade coal cleaning has been built in the Dnepropetrovsk Region of the USSR. The new equipment is based on radioactive cobalt isotopes which are used to regulate the level of sediment deposited on the bottom of a jigging machine, ensuring the separation of high-grade coal. It is claimed that application will improve the efficiency of the plant by 20 to 25 per cent.

Another new item of coal cleaning plant is an improved multi-channel separator which sorts coal by means of X-rays. A conveyor has been mounted on every channel of this machine, which consists of small buckets with opening bases. Special mechanisms load the coal into the separator and distribute it evenly along the conveyor lines. X-ray equipment keeps a continuous watch on the moving coal and sends out impulses to electronic instruments which sort out the coal and separate it from the stone. The X-ray separator is controlled from a panel installed in the pit office, and it is claimed that the new unit can replace 30 operatives.

First Flameproof Tractor at British Mine

TO meet the need for a general purpose machine suitable for operation in the limited space available below ground in mines, the Hunslet Engine Company, Limited, has produced a compact flameproof 25-h.p., rubber-tyred, four-wheel-drive tractor; it is the first flameproof tractor in service at a British colliery.

The tractor is fitted with slew steering which allows great manœuvrability and precision of control, enabling it to operate alongside conveyors without damaging either the conveyor or the arches. Acute corners can be negotiated, the turning radius being only 5 ft. 6 in. This type of steering obviates the need for a differential lock and also facilitates the use of a variety of ancillary equipment which can be supplied with the tractor.

The tractor is controlled by a throttle, a forward/reverse selector, and two levers, each of which

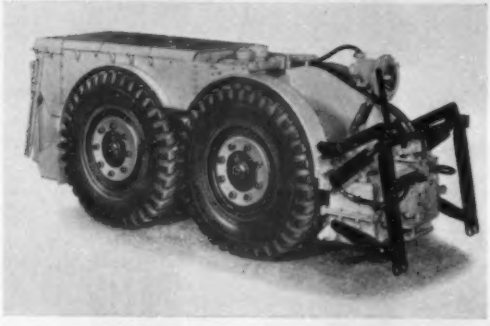


FIG. 1.—HUNSLET MT25 FLAMEPROOF DIESEL HYDRAULIC MINES TRACTOR.

operates the brakes on a pair of wheels. The controls are conveniently arranged for use from alternative driving positions, one for each direction of travel.

With this arrangement the driver can always face the direction in which the tractor is moving, thus facilitating steering and eliminating blind spots.

Hydraulic Starter

A Perkins "Three 152" water-cooled, three-cylinder diesel engine, with chromium-plated liners and mechanical governor, is incorporated, derated to develop 25 h.p. nett at 1,650 r.p.m. The engine is started by a hydraulic starter. Transmission from the engine is through a torque converter to an epicyclic forward and reverse gearbox, then through reduction and transfer gearing, multi-plate clutches, and worm drives. The worm drives are incorporated in each wheel. This unique transmission system facilitates the servicing of clutches, brakes, and final drive, and enables a four-wheel-drive tractor with large diameter tyres to be built down to a width of 3 ft.

The stainless steel exhaust gas conditioner is constructed on the Hunslet "Jet" principle to ensure maximum cleansing of the exhaust gases and safety of operation even when working over undulating ground. An exhaust conditioner low-water level engine shut-off device is fitted and the whole of the exhaust system, including the conditioner, is water-jacketed. The gases from the conditioner are diluted with air from the fan before exhausting to atmosphere.

Maintenance has been reduced to the absolute minimum. Apart from the diesel engine, lubrication is only required annually. The tractor is of particularly rugged construction and any load likely to be encountered in the pit can be superimposed on the tractor, as the total load capacity of the large diameter "power grip" tyres is over 12 tons. Alternatively, the load can be hauled on rubber-tyred trailers, which follow accurately in the path of the tractor or on steel skid pans. The skid pans can conveniently form a baseplate for pallet loads and, in addition, can be quickly converted into articulated trailers.

The basic tractor incorporates a hydraulic pump and the frame is designed for the attachment of a hydraulic linkage to which the following times are quickly fitted:—Angledozer; low-lift shovel of 2 tons capacity; fork lift of 2 tons capacity; crane; articulated trailer coupling; skid pan coupling. In addition, winches are available, driven through the torque converter or by the hydraulic pump.

The Hunslet MT25 was developed as a basic multi-purpose tractor for material handling, development work, and recovery duties underground. It is obvious that such a versatile and flameproof machine is also ideally suited for numerous duties on the surface, especially where there are space limitations. Principle dimensions of the Hunslet MT25 mines tractor (Fig. 1) are as follow:—Length over drawgear, 8 ft. 11½ in.; width overall, 3 ft.; height overall, 3 ft. 5 in.; carrying capacity, on top of tractor, 27,000 lb., on carrying plate, 4,000 lb.; drawbar pull, at starting, 4,200 lb., at 2 m.p.h., 2,900 lb., at 4 m.p.h., 1,700 lb.; maximum gradients with 4,500 lb. superimposed load, 1 in 3 at 1.3 m.p.h., 1 in 5 at 3.4 m.p.h.; weight in working order, 5,500 lb.

US Professor to Lecture in London

Prof. Linus Pauling, of the California Institute of Technology, has accepted the invitation of the Metal Physics Committee of the Institute of Metals to give a lecture during his forthcoming visit to Britain. His subject will be "The Structure of Metals and Intermetallic Compounds" and the lecture will be delivered at the Royal Institution, Albemarle Street, London, W.1, at 6.30 p.m. on July 25. Visitors will be welcome and tickets are not required.

Samuel Fox's

New Ultra High-strength Steels

NEW series of ultra high-strength steels for use at high temperatures has been developed by Samuel Fox & Company, Limited, a subsidiary of the United Steel Companies, Limited. The steels have been designed to give tensile strengths of between 100 and 140 ton/sq. in. after tempering at up to 600 deg. C. In addition to permitting higher operating temperatures to be considered in design compared with steels which are currently being specified for these strength levels, the high tempering temperature will yield maximum stress relief and, therefore, greater dimensional stability.

There are at present three steels in the new series, of which the first is a commercial alloy already in production. This steel is well known to give 100 tons tensile strength in the air-hardened and tempered condition.

Formerly described as Fox 769, it has now been renamed HST 100.

The two entirely new steels in the series have been obtained by small compositional changes in the basic HST 100 analysis, but there is no increase in the carbon content, while use has been made of a combination of solution hardening and improved tempering resistance. The steels are known as HST 120 and HST 140, and have tensile strengths of 120 and 140 ton/sq. in., respectively, at room temperature. It has been possible to reduce the carbon content of HST 120 to 0.30 per cent. Both these steels can be hardened in either air or in oil, depending on mass, and all three in the series have silicon contents below 0.40 per cent.

Fig. 1 shows a comparison of the tempering characteristics of the HST steels, and Fig. 2 illustrates the elevated temperature tensile properties in the range 20 to 600 deg. C. It will be seen that, C., tensile strengths of 98, 115, and 137 ton/sq. in., respectively, have been obtained at room temperature, combined with remarkably good ductility

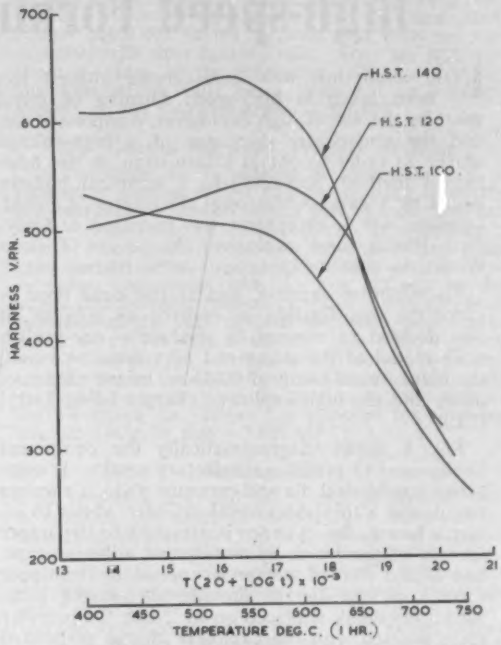


FIG. 1.—THE TEMPERING CHARACTERISTICS OF HST STEELS.

at the preferred tempering treatment of 600 deg. figures. Still higher tensile properties can be obtained, of course, by small adjustments to the tempering treatment. HST has shown a 13 per

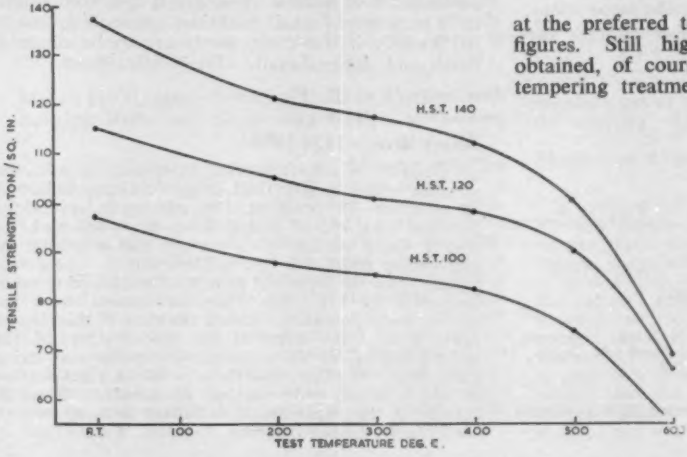


FIG. 2.—THE TENSILE PROPERTIES OF HST STEELS. INITIAL CONDITION: OIL HARDENED AND TEMPERED 600 DEG. C. ONE HOUR.

cent. elongation and a 41 per cent. reduction of area felt that these are fairly typical figures.

The HST steels can be produced in the form of billets, blooms, and slabs for forging and re-rolling, and in bars for forging or machining. Bars can be supplied either in the annealed or fully hardened and tempered conditions. Experiments are taking place to produce sheets down to 0.064 in. thick in all three qualities, but these are not yet generally available.

Applications for the HST steels are expected to be found in the aircraft and rocket industries, although HST 140 could probably be used to advantage as a hot die steel.

High-speed Forming of Metal Sheets

FOR some time now considerable interest has been taken in high-speed forming of metal sheet by the use of high explosives, compressed air, and the underwater discharge of a high-voltage spark. In order to obtain information on the first-named method, according to a technical bulletin issued by Vickers-Armstrongs (Engineers), Limited, London, S.W.1, equipment was prepared at Crayford Works, and explosive charges at Thames Works, to enable experiments to be carried out.

To minimize expense, and at the same time to make the investigation as realistic as possible, it was decided to attempt to produce a one-twelfth scale model of the dome end of a pressure vessel, the blanks used being of 0.036-in. bright mild-steel plate, and the high explosive charges being Tetryl (CE).

Fig. 1 shows diagrammatically the equipment finally used to produce satisfactory results. It comprises a mild-steel die and pressure plate, a vacuum pump, and a thin sheet-metal cylinder, about 16 in. high. In use, the cylinder is attached to the upper surface of the blank by waterproof adhesive tape, and a thin film of grease is applied to the upper surface of the die, to provide an airtight joint, before the blank is placed on it. Next, the pressure plate is fitted, and the explosive charge suspended in the cylinder, which is then filled with water. Finally, air is evacuated from under the blank before the charge is detonated.

In the course of the experiments, charges varying in weight from 30 grn. to 80 drm. were used, these being located at from 2.5 in. to 8 in. above the centre of the blank. The charges were made either cylindrical or hemispherical in shape, but it appeared that the latter gave the more satisfactory results, although the evidence was by no means conclusive. It was found that, as with conventional press working, the pressure plate is essential to prevent wrinkling of the plate. Indifferent results were achieved with a vacuum of 24 in. Hg., the residual trapped air in the die causing dents in the dome ends. It was finally established that very satisfactory results could be obtained by using hemispherical charges of 400 grn., located 2.5 in. above the centre of the blank, a vacuum of 29 in. Hg., and 0.5 in. entry radius on the die. The dome ends so produced varied extremely little dimensionally, there being virtually no spring-back of the material, and the finish was very good. Further, there was relatively little change in the thickness of the finished material, the maximum reduction being about 0.003 in. This, presumably, can be attributed to the explosive force being applied almost instantaneously over the whole surface of the blank, whereas in conventional press work there is a concentration of stress at the nose of the punch.

While explosive forming cannot compete with press working in large quantity production of components of normal materials, it can be economically attractive if small quantities are required, more particularly if the components are to be of good finish and dimensionally closely toleranced.

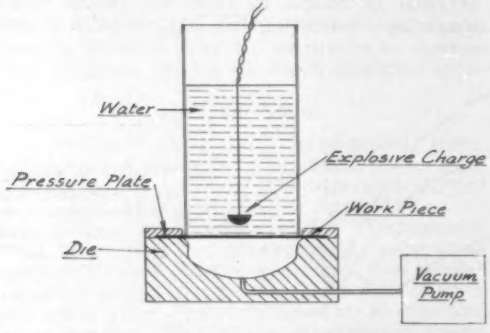


FIG. 1.—EQUIPMENT FOR SHEET FORMING BY SUBMERGED EXPLOSIVE.

Sulzer Bros.—1834-1959

"Growth of an industrial enterprise is mirrored nowhere more clearly than in the ultimate object of its existence—its products. By passing in review the principal products of Sulzer Bros., this book seeks to give a living picture of a century and a quarter of engineering endeavour and achievement." These sentences, from the foreword of a book published to commemorate the 125 years since the foundation of the famous Swiss company, indicate the aims of this elegant publication. The story of the past history of the undertaking is related in words and pictures covering more than 100 pages, and there is also a short section in which future prospects are discussed. The UK branch of the organization is Sulzer Bros. (London), Limited, 31, Bedford Square, London, W.C.1.

Metallurgical Patents in the US

Some Recent Inventions

DESCRIPTIONS of metallurgical patents given below have been taken from details given in the Official Gazette of the United States Patent Office.

Apparatus for Casting Molten Metal

An apparatus for casting a continuous strip from molten metal comprises a casting wheel mounted to rotate about a horizonal axis, the wheel having a rim provided with side flanges defining the width and thickness of the strip to be cast. Means in contact with the periphery of the flanges provide a casting gate; two concentric walls with connecting walls defining a chamber in the rim; a partition in the chamber attached to an inner concentric wall and extending a part of the radial distance to an outer concentric wall of the chamber leaving a small aperture, and a fluid intake communicating with the chamber on one side of the partition. An outlet communicates with the chamber on the other side of the partition, the latter directing the fluid to circulate around the circumference of the chamber. Means are provided for supplying cooling fluid under pressure to the intake.—2,928,148.

Temperature Control During Metal Casting

In the casting of molten medium and low-carbon rimmed steels and more highly deoxidized steels wherein the molten metal is passed through a tundish into a mould, an improvement comprises introducing a gas containing at least about 80 per cent. oxygen into the space above the metal surface in the tundish for effecting controlled oxidation of the metal whereby the exothermic heat of oxidation supplies at least part of the heat required to maintain the effluent metal from the tundish at a satisfactory casting temperature not less than about 1,500 deg. C. The controlled oxidation results in the removal from the metal of not more than about 0.04 per cent. C, not more than about 0.06 per cent. Mn, and not more than about 0.06 per cent. Si, and, in any case, controlled oxidation results in no substantial interference with the action of the metal in the mould.—2,928,150.

Means for Keeping Working Rolls in Contact with Backing Rolls and Supporting Rollers in Rolling Mills

A multi-roll stand, comprises a roll housing, including two supporting bridges, two working rolls supported in the roll housing, two motor-driven backing rolls, journalled in the roll housing, driving the working rolls by friction, the plane containing the axes of the working rolls being offset out of the plane containing the axes of the backing rolls. Two carriers are supported by and vertically slidable on the supporting bridges of the roll housing, and supporting rolls, at least one for each working roll, are journalled in the carriers on that side of the plane containing the axes of the working rolls which is remote from the plane containing the axes of the backing rolls. Separate adjustable pressure pieces engage the necks of the working rolls. Intermediate rolls, one between each working roll and its supporting rolls, are power-operated to press each working roll against its intermediate roll thereby pressing the intermediate roll against its supporting roll. Further power-operated means on the supporting bridges press the supporting rolls into frictional engagement with their backing rolls. Arms are rockable about the axes of the supporting rolls, the working and intermediate rolls being journalled in bearings slidable on the rockable arms.—2,927,489.

Die Control for Cold Pressure Welding

A composite jaw is adapted in connection with a supporting member with a pair of adjoining angularly disposed cam surfaces to form a part of a machine for cold pressure welding of workpieces. It comprises a pair of side-by-side die sections movable to and from one another. These are provided with cam surfaces in sliding engagement with the cam surfaces of the supporting member, respectively; also a stop means is provided at the rear of each die, each stop means being a pin having a conical end, with a track establishing the pin for longitudinal adjustment along a path wherein the conical wall of the end is adjustable throughout a range along the path of reciprocation of the associated die. Means are provided for adjusting the pin along its path.—2,927,487.

Rolling Mill

A vertical rolling mill has a pair of vertical rolls, a coupling connected to each roll, a drive spindle connected at one end to each coupling, and a pinion connected to the other end of each spindle. Means permit the rolls to be adjusted vertically without loss of driving connection between the rolls, couplings, spindles and pinions, the connection between each roll and its coupling permitting the coupling and spindle to be suspended downwardly from the roll, the roll being formed with an annular groove which lies within the coupling, the coupling itself being formed with radial bores which normally reside adjacent the groove. Spherical detent members normally residing both in the groove and in the bores provide a locking connection between the coupling and roll, and means extending out of the rolling mill are operative to move the detent members out of the groove to disconnect the roll from the coupling.—2,927,488.

Method of Continuously Forming Welded Coated Steel Tubing

A method for continuously forming welded tubing of steel coated with a coating metal and replacing coating metal destroyed by the welding operation. It consists essentially in continuously forming a flat strip of coated steel into tubular configuration and welding the adjacent edges of the formed strip, and thereafter promptly and continuously spraying additional molten coating metal along the weld line on the outside of the tubing from a point of application in close proximity to the weld point, the point of application being so chosen that the temperature of the tube at the weld line is sufficiently high so that the additional coating metal, upon contact with the tubing, will flow instead

of freezing, and will firmly bond to the uncoated areas of the tubing and fuse with the original coating remaining on the tubing, so as to thereby form a coating replacing that lost during the welding operation.—2,927,371.

Method for Forming Close Tolerance Tubing and Articles Thereon

A cold-stretching method for transforming stock tubing of a deformable material to close tolerance tubing of a predetermined wall thickness. It comprises the steps of: disposing a length of stock tubing in a single plane; placing the entire length of tubing under tension in a cold state by opposed forces applied to the end portions; increasing the tension on the length of tubing by increasing the opposed forces until the yield point of the material forming same has been exceeded; and continuing to increase the tension until the initial wall thickness has decreased to the predetermined thickness.—2,927,372.

News from Australia

New Zealand Steel Project

AN Australian group of companies would begin forming a £20,000,000 steel company in New Zealand this year, Mr. H. Korman said recently. The New Zealand company would manufacture iron, steel, and other metal products. It would import sheet steel from Australia and other countries. Mr. H. Korman is associated with his brother, Mr. Stanley Korman, in the Stanhill Holding group of companies, one of which is the Chevron group.

The company's name will be the New Zealand Development & Manufacturing Company, Limited, with an initial paid-up capital of £3,000,000. Sixty per cent. of capital will be subscribed in New Zealand. Australian, British, and American companies will subscribe 40 per cent. Mr. Korman said underwriters in these countries already had arranged to handle the issue. Australia and New Zealand underwriters had arranged, tentatively, a conference for the last week in May.

The new company's operations would include the manufacture of small-gauge steel rod; wire rope to supply New Zealand market and for export; wire products, including wire netting and types of woven and mesh wire and steel; galvanized, cast-iron, and non-ferrous pipes in all types and sizes.

Mr. Korman said: "New Zealand, Australia, Britain, and America already have furnished the money to finish investigation and prepare the ground for this heavy development programme. The new industry should save New Zealand millions of oversea funds each year."

The Western Australian Government is interested in the possibilities of establishing an integrated iron and steel industry in the State and the project is being discussed with the Broken Hill Proprietary Company, Limited. It has been estimated that the State's surface iron-ore deposits indicate the possibility of 275,000,000 tons of ore with an iron content of 60 per cent. and 223,000,000 tons with less than 45 per cent. Extensive exploration of these deposits will be necessary to establish with certainty a tonnage to justify an iron and steel project. The scattered nature of the deposits and transport charges involved will be important factors in such a project.

It is proposed to ship 50,000 tons of iron ore annually from Iron Range, Cape York Peninsula, Queensland. A 20,000-ton trial shipment is to be made to the Broken Hill Proprietary Company in June. The deposit is inland from Portland Roads. Possibility of regular mining operations will depend on the trial shipment of ore proving satisfactory.

It is generally believed that New South Wales is deficient in large reserves of iron ore, but this is by no means certain. A thorough survey of all possible areas could well reveal considerable deposits. This was stated recently by Mr. Davis Hughes in the NSW Parliament, when advocating more intensive full-range geological surveys of the State's mineral potentialities. The finding, Mr. Hughes said, of such reserves as would not be required by the BHP for its present plants could well be used as an incentive for the establishment of a new steel industry which is urgently needed to supply Australian demands and would find ready export markets. Again, modern developments show a trend towards plants with smaller output and capital requirements. Mr. Hughes added that any government which is so vitally interested in increasing coal consumption should be active in this field.

Revision of Standard

Two new parts of the Australian Standard No. K.1, "Methods for the Analysis of Iron and Steel," have recently been announced by the Standards Association of Australia. They are:—Part 12—1959: "Method for the Determination of Nitrogen in Steel"; Part 13—1959: "Method for the Determination of Vanadium in Iron and Steel." Both are endorsements, with Australian amendments, of the relevant parts of the British Standard 1121. The methods have been the subject of investigation by the association's Committee on Sampling and Analysis of Ferrous Metals.

In the nitrogen method, this element is converted to ammonia, which is separated by steam distillation from a solution made alkaline with sodium hydroxide. The distillate is titrated with hydrochloric acid. During its investigation of the method, the committee verified the reproducibility claimed for the method and paid tribute to the thoroughness of the British investigation.

The method for vanadium details an oxidation to the quinquivalent condition with potassium permanganate in cold solution. Excess of potassium permanganate is reduced with sodium nitrite; sulphuric acid is used to destroy the excess of nitrite. Hydrochloric acid is added, and the oxidized vanadium is titrated with standard ferrous ammonium sulphate using preoxidized sodium diphenylamine sulphonate as indictor. In endorsing the British method, the Australian committee has widened the reproducibility range.

Law Cases

Bolt and Nut Pact

"INTER-TRADING BENEFITED THE CUSTOMER"

SINCE an agreement began to operate between all members of the Black Bolt and Nut Association there had been a wonderful improvement in the quality of the products supplied and reasonable prices for the public, said Mr. B. J. MacKenna, QC, in the Restrictive Practices Court on Monday. Mr. MacKenna is representing the association, whose agreement is being considered by the court on reference from the Registrar of Restrictive Trading Agreements. The hearing is expected to last 10 days.

Mr. MacKenna said that customers of the association would be coming to give evidence in support of the agreement. "Buyers of the goods are reluctant that this agreement should be terminated," he told the court. The agreement, he said, fixed the prices at which 44 members of the association could sell black bolts and nuts. The larger manufacturers generally made the standard sizes of bolts and the smaller manufacturers made the more specialized types.

The association encouraged a policy of inter-trading and members were enabled by a system of inter-trading discounts to acquire the products of other members at a very reasonable price. A single order, therefore, might include a wide range of bolts, but any member could supply all the bolts required, thus saving the customer the expense of several orders.

"Unrelieved Gloom"

Mr. MacKenna said that between 1922 and 1933, when there was no agreement, the industry was in a state of unrelieved gloom. Its products were being sold at unremunerative prices, there was no flow of capital investment in the industry, and the quality of its products was unsatisfactory. Since the agreement began to operate in 1933, there had been generous co-operation between members on schemes of co-operative research and exchange of technical information, a wonderful improvement in the quality of the products supplied, plentiful investment in capital assets and new plant, decent labour conditions, and reasonable prices for the public.

No advantage had been taken in times of scarcity to increase prices and in such periods, Mr. MacKenna went on, the agreement kept prices below those obtainable in a free market. The fixed prices were based on averaged costs plus reasonable profit margins, and prices were increased only to cover increased costs, he said. The table of profits prepared by the accountants showed profits to be at a reasonable level.

Mr. MacKenna contended that the agreement was justified under section 21(1) (b) of the Restrictive Trade Practices Act, 1956. If the agreement were terminated, there would be a return to the conditions of unmitigated depression from which the industry had been rescued by the agreement, and the public would lose substantial benefits.

Mr. M. H. Tollitt, chairman of Guest, Keen & Nettlefolds (Midlands), Limited, said in evidence that there had been an enormous improvement over the years in the manufacture of black bolts and nuts, which were now well made. The stability given to the trade by the association's agreement had resulted in considerable development. "The British bolt and nut industry is probably now in advance of any other country in the world with the possible exception of the US," he said.

Another witness, Mr. P. H. Smith, a director of G. H. Smith & Company (Bankhall) Limited, of Liverpool, said the price stability resulting from the agreement was an advantage to a firm like his because a stockholder had to work on a small profit margin. It reduced administrative costs in not having to circularize customers about price changes. Mr. Smith said that manufacturers maintained a quality standard of packaging which would be prejudiced if the agreement were terminated.

Earlier, Mr. Peter Foster, QC, for the Registrar, suggested in his cross-examination of Mr. W. E. Carnelley, a chartered accountant, that £14,800 spent a year on research, as the evidence showed, was negligible when related to the turnover of home trade at £13,950,000. Mr. Carnelley agreed that the recorded amount on research was very small, but he pointed out that there was quite a lot of hidden research which could be included in production costs.

Mr. D. E. Hulme, purchasing officer of West Midlands Construction Erection Company, Limited, of Willenhall (Staffs), said the main benefits of the association agreement were service and quality. He was completely satisfied with service received from members of the association. Mr. F. Lord, a member of the central council of the association, said the object of the council's price policy was to maintain the lowest possible price consistent with the economic conditions of the trade.

Woman Blames Mining for Pavement Subsidence

WOMAN unsuccessfully sued the National Coal Board for £400 damages at Pontefract County Court for personal injuries in a fall near her home in October, 1958. The plaintiff, Mrs. May Hobman (53), said the fall was caused by pavement stones which had subsided because of mining.

Judge Ernest Ould, who awarded judgment with costs

to the defendants, said he was sorry the plaintiff must fail. "The law is such that as it stands at the moment she is prevented from getting justice. The fault of this case lies on the part of Castleford Corporation who left the footpath in a deplorable condition." Mrs. Hobman did not understand, he went on, that a local authority was not liable for damage caused by non-repair.

It was an anomalous position dating back hundreds of years and a situation that was crying out for a change in the law, he said.

Witnesses for the NCB denied that the unlevel pavement could have been caused by subsidence. Mr. G. W. Hardwick, assistant land and minerals officer of No. 8 (Castleford) Area of the North-Eastern Division, said that all pavement damage caused by subsidence in the Area had been repaired at the board's expense.

KNEE INJURY CLAIM FAILS

CLAIM for £400 damages against the National Coal Board by a former oven charge man at Grassmoor Coke Ovens was dismissed by Judge Sir Henry Braund at Chesterfield County Court. The plaintiff, Mr. Francis Millward, sued on the grounds that the board had failed to ensure the floor of a coke oven on which he was working was sound, and claimed that he had twisted his left knee while working there. He said that his foot caught either in a hole on the uneven surface on top of the oven or on a manhole which was jutting up.

For the board, Mr. D. S. Forester-Paton said the accident occurred because Mr. Millward had made an awkward movement and there was a medical report that he had weak leg ligaments. There was no evidence that the floor was uneven. The judge said the injury was not due to any failure by the board. "The real reason for the accident was that there was a weakness in the man's left knee and the strain might have taken effect at any time." There were agreed special damages of £124 8s. 4d. Costs were awarded to the board.

1,000 FT. DEATH FALL CLAIM

WIDOW of a miner who was killed when he fell 1,000 ft. down a shaft at Glencraig Colliery (Fife), in November, 1956, was awarded damages of £2,700 by a jury sitting with Lord Guthrie in the Court of Session. The woman, Mrs. Mary Pearson or Mackinnon (63), sued the National Coal Board for £5,000. The jury, by a majority of eight to four, found for the plaintiff and assessed damages at £4,050 but held that her husband, Mr. James Mackinnon, was one third to blame for the accident.

Mr. Mackinnon and another employee, it was stated, were repairing a broken beam dividing the two winding spaces in the shaft. The cage was lowered so they could stand on top of it. Mr. Mackinnon's foot slipped and he fell to the bottom of the shaft. It was contended that the board should have provided a safety harness. Available harnesses, it was said, were all too small for Mr. Mackinnon.

The board denied liability and maintained that the roof of the cage afforded a good footing. Harness was available for Mr. Mackinnon's use, but he had regularly refused to wear it, although this practice was not countenanced by the management.

PROFESSOR BACKS OFFICIALS

PRECAUTIONS taken after a fall of stone at Brancepeth Colliery (Co. Durham) were commended by Professor Granville Poole, Emeritus Professor of Mining at King's College, Newcastle, giving evidence at Bishop Auckland County Court. A miner, Mr. Thomas William Hudson (42), who was helping to replace arches the day after the fall, was hit on the back by a falling stone. He alleged negligence by the National Coal Board and claimed £300 damages.

Prof. Poole said: "The main thing is to put up permanent support as soon as possible, which is what was happening at the time of the accident. The officials did the correct thing. I was once an inspector of mines and I would classify this as an unavoidable accident." The undermanager, Mr. Arthur Hunter, said that temporary supports were erected in the cavity. "I did not consider that further protection was necessary," he said.

The case was adjourned indefinitely because a witness for Mr. Hudson was in Paris and could not be present.

£2,104 FOR LEG INJURIES

DAMAGES of £2,104 were awarded at Newcastle-upon-Tyne Assizes to a plater who received leg injuries in a 30-ft. fall while working at Smith's Dock Company, Limited, North Shields. The plaintiff, Mr. George New (30), said he was told to move a steel ladder from a cargo tank of a tanker. He fell when the ladder came away after he had taken four or five steps on it.

The company denied negligence and breach of duty and submitted that Mr. New had not tackled the job properly.

STONEMAN WAS awarded £430 damages with costs against the National Coal Board in an action at Northumberland Assizes. Mr. Thomas John Wilson (39) claimed for personal injuries received in an accident at North Seaton Colliery when he fell from a tub and a girder fell on to his back.

DAMAGES OF £1,540 and costs were awarded at Cumberland Assizes to Mrs. Margaret Marie Rapacioli, of Whitechapel, London, widow of a miner killed in a shotfiring accident in April, 1958. Mrs. Rapacioli claimed against the Beckermet Mining Company, Limited, employers of her husband, Mr. Antonio Rapacioli (25). The action was settled.

MINER SUFFERING from silicosis who claimed he had been totally unable to work since November, 1958, was awarded damages of £5,250 with costs in the High Court, Dublin, against Lynn's Sligo Coal Mining Company, Limited. The plaintiff, Mr. John Cummins, alleged negligence which the company denied. Mr. Justice McLoughlin allowed a stay of execution.

Air-Blasting in Mines

SECTION 69 of the Mines and Quarries Act, 1954, provides for regulations to be made governing the supply, storage, and use at mines of blasting materials and devices. The supply, storage, and use of explosives in coal mines is governed by the provisions of the Coal Mines (Explosives) Regulations, 1956, and the use of Cardox and Hydrox by the Coal Mines (Cardox and Hydrox) Regulations, 1956. The purpose of the Coal Mines (Compressed Air Blasting Shells) Regulations, 1960, is to make similar provision in respect of the use of blasting devices which depend for their action on the discharge of high pressure compressed air.

The new regulations have been issued in draft form. It is intended that they should come into operation on August 1.

IRON AND STEEL TRADE

CONTRASTING experience of the steel industry here and in the US emphasizes the decisive influence exercised by consumer stockpiling. In America there was an excessive rush on the part of steel users to increase inventories after the strike. Now the wheel has turned full circle, estimates of consumer needs were put too high, and there has been a rapid contraction in orders. In the UK the current practice has been reversed. In the first quarter of the year steel consumption rose by about 1,000,000 tons and another 500,000 tons has been taken up for stock replenishments and increased exports.

Pig-iron

The economics of the steel industry almost exactly conform to earlier expectations. Long-term planning envisaged a gradually rising ratio of hot metal in the steel furnaces and so it has proved. Supplies of scrap are inelastic: more pig-iron is required and blast furnacemen have only been enabled to cope with the heavier requirements of the melting shops by improvements in the techniques of pig-iron production.

The increasing use of sinter has resulted in substantial economies in fuel consumption which appear to have tipped the balance in favour of basic iron for use in the open hearths.

Ferro-alloys

The price of ferro-tungsten was increased on Monday by 3d. per lb. W. to 11s. 9d. per lb. W. contained. Tungsten metal powder is similarly increased to 14s. 9d. per lb. Little change is noted, however, in the demand for ferro-tungsten, and most other items remain well supported.

Ferro-silicon is quite active, while silicon metal is slightly supported. There is a good demand for ferro-chrome and ferro-manganese, and calcium silicide is fairly active. Reasonable attention is given by certain consumers to supplies of ferro-sulphide and ferro-phosphorus. There is a steady request for ferro-niobium, and ferro-titanium remains of interest. Both ferro-molybdenum and ferro-vanadium are receiving moderate support.

Semi-finished Steel

Further plans have been approved for the installation of new billet mill capacity but these cannot mature in time to make any immediate contribution to the relief of the present shortage of supplies.

The further increase of imports from the member States of the ECSC seems to be the only solution, if the re-rollers are to make full use of their capacity.

Finished Steel

The pattern of demand for finished steel products has undergone little change. The motor industry has enormously exceeded estimates of sheet consumption and the US appears to be the only source of supply.

Statistics of approved projects of industrial re-equipment show that these have been more than doubled in 12 months and rollers of heavy structurals are reaping the benefit. The heavy engineering trades are also very busy and their continuing high requirements are helping to sustain the healthy tone in the steel industry.

THE Department of Scientific and Industrial Research has made a grant of £36,050 for a year to Prof. K. C. Dunham, FRS, to enable the Durham College's Geology Department to put down a corded borehole to investigate the foundation of the Pennines.

Spring Records for Appleby-Frodingham

END of April and the first week in May was a record-breaking period for the Appleby-Frodingham Steel Company branch of the United Steel Companies, Limited. The Frodingham melting shop produced 44,019 tons, beating the previous best of 43,760 tons which has stood for 12 months. The "B" Ajax furnace also made a four-weeks period record with 20,770 tons, compared with the 20,310 tons of May, 1959.

Two records were contributed by the plate mills. The charged weight in the slabbing mill was 67,266 tons, against 66,538 tons rolled during the four weeks ended April 9. The tonnage of plates despatched was also a record at 42,820 tons, compared with 42,535 tons of the four weeks ended February 13.

The coke ovens not only produced a record 63,454 tons, but the coke was of very high quality. The previous record was 62,460 tons made during the four weeks ended March 12.

John Thompson Dividend Cut

WITH a final of 12½ per cent., John Thompson, Limited, combustion and general engineers, of Wolverhampton, is cutting its dividend from 25 per cent. to 20 per cent., although the decrease is not as great as was feared. Trading profits fell from £1,742,336 to £1,331,642, before tax of £457,495 (£736,868).

The report says that an overall loss is ultimately expected on the Berkeley nuclear power station contract. No provision has been made in the accounts for this loss, but while the overall loss cannot yet be assessed, £500,000 has been set aside in a special reserve to cover John Thompson's share of the loss that may be incurred by AEI-John Thompson Nuclear Energy Company, Limited.

Newton Chambers to Acquire Sheet Metal Workers

AT the annual meeting of Newton, Chambers & Company, Limited, ironfounders, engineers, etc., of Thorncliffe, near Sheffield, the chairman, Sir Peter Roberts, announced that the company proposed to acquire the business of Rhodes & Halmshaw, Limited, sheet metal workers, of Ossett, Wakefield.

He added that some 70 per cent. of Rhodes & Halmshaw's business comprised work done for Newton Chambers, particularly for the excavator division.

Coalfield News

ABOUT 1,600 miners at Dodworth Colliery (Yorks), who had been on strike for several days, resumed work on Monday so that negotiations could take place.

CLLR. WALTER FRANCIS, a miner at New Shildon Colliery (Co. Durham) and chairman of the local miners' lodge, has been elected chairman of Shildon urban council. He is 38 and one of the council's youngest chairmen.

DISMISSAL NOTICES were given to 350 miners at Greenrigg Colliery (West Lothian) today (Friday). Part of the colliery closed in March and the remaining sections are to close on Thursday. It is expected that the men will be absorbed at other pits in the Area.

HORSE owned by Mr. J. Mason, a miner who was crippled in an accident at Vane Tempest Colliery (Co. Durham) two years ago, won its race at Pontefract on Saturday. Mr. Mason bought the horse, Joseph, with part of the money he received as compensation for his accident.

ARTHUR MARKHAM MEMORIAL PRIZE which is awarded in a literary competition for mineworkers arranged by Sheffield University is to be shared by five mineworkers. They are Mr. B. L. Coombes, Mr. R. D. Davidson, Mr. W. H. Colclough, Mr. J. King and Mr. R. Toon.

DEARNE AND DOVE Internal Drainage Board is to ask the NCB to contribute 75 per cent. of the cost of cleaning out Brook Dyke, Wath-on-Dearne (Yorks). The IDB states that heavy silting has been caused by a dam built across the dyke by the NCB. The Coal Board has offered 50 per cent. of the cost.

ON FRIDAY of last week Mr. Maurice Wray (21), a labourer, was buried in a fall of shale from a 20-ft. high wall at the Bentley Colliery tip (Yorks). It took his rescuers three quarters of an hour to dig him out. Shale from the site is being used for the new £40,000,000 power station at Thorpe Marsh.

COAL SHIPMENTS from the port of Blyth (Northumberland) in April were 434,394 tons compared with 404,680 tons last year. At 2,060,738 tons, the total for the first four months of the year was 232,976 tons more than for the corresponding period last year, while foreign shipments at 230,441 tons were three times greater than in 1959.

TWO PRIVATE COAL MINES in West Lothian closed on Friday because they were no longer economical, due, it is stated, to the 40 per cent. cut in production ordered by the National Coal Board. The mines are Stonehead, owned by Kerr & Adams, Limited, and Dumback No. 2, owned by J. J. K. & D. C. McMillan, Limited, Whitburn. Stonehead employs 30 men and Dumback 13.

UNDERGROUND ROADWAY has been built between Chilton and Dean and Chapter collieries (Co. Durham) so that all coal from Chilton can be drawn to bank at Dean and Chapter. The reorganization has meant that 69 men from Chilton Colliery have been given 14 days' notice. An official of the NCB said that a number of the men would be found alternative employment at other collieries during the period of their notice.

SHIPMENTS of coal and coke from the South Wales ports last week totalled 40,111 tons, a drop of 5,814 tons on the previous week and 13,205 tons lower than in the corresponding period last year. Tonnages exported from the various ports in the week ended May 22, 1960 (with figures for the week ended May 21, 1959, in parentheses) were:—Newport, 1,553 (10,688); Cardiff, 4,635 (11,551); Penarth 4,303 (4,218); Barry, 8,109 (7,161); Port Talbot, 705 (702); Swansea, 20,806 (18,996).

Coal Stocks Creeping Up

UNDISTRIBUTED coal stocks are creeping up again. At 33,256,000 tons they are back to the early March position, and 11,000,000 tons above the comparable 1959 figure. The rise is to be expected, but distributed stocks at 11,865,000 tons, although slightly improved since the beginning of the month, are still 2,000,000 tons below last year's total.

Output appears to be settling down to just over the 4,000,000-ton mark and so far this year it is just over 4,000,000 tons less than for the first 20 weeks of 1959.

There were 608,200 wage-earners on colliery books on May 14, against 667,600 on May 16, 1959, the numbers engaged at the coal face being 232,900 and 259,500 respectively. Total absenteeism (all workers) in the week ended May 14 was 14.73 per cent. compared with 15.04 per cent. in the week ended May 16, 1959. Output at the face was 3.967 tons and overall 1.411 in the week ended May 14, compared with 3.742 and 1.344 tons in the week ended May 16.

The following table gives (in tons) the output of saleable mined coal by division in the week ended May 14, and the tonnage lost through all causes (holidays, disputes, and go-slows):—

Division.	Week ended May 21, 1960.		Week ended May 16, 1959.*
	Total output.	Tonnage lost.	Total output.
Scottish	360,500	9,900	386,400
Northern (N&C) ..	248,200	—	274,100
Durham	458,300	—	482,100
North-Eastern ..	838,700	13,000	829,000
North-Western ..	265,900	700	293,100
East Midlands ..	901,400	400	909,800
West Midlands ..	289,000	2,600	314,400
South-Western ..	397,600	6,100	433,200
South-Eastern ..	31,500	—	30,700
Great Britain—			
Deep-mined coal ..	3,791,100	32,700	3,942,800
Other deep-mined (including licensed mines) ..	42,700	—	57,000
Open-cast coal ..	169,200	—	245,900
TOTAL	4,003,000	32,700	4,245,700

* Nearest normal week.

Miners Request Instant Dismissal

MINERS at Markham No. 4 Colliery (Derbyshire) went out and found jobs at other pits at the weekend after the recent dismissal of 30 of their fellow workers as part of the NCB plan to cut production. When they asked for their cards on Monday, so that they could start their new jobs, they were told that they would have to work a fortnight's notice.

Mr. Bert Wynn, secretary of the Derbyshire branch of the NUM, who was called in and secured the men's instant dismissal, said that the trouble with the alternative employment found by the board for redundant miners was that it was only around 30s. a day. "The men have found they can find better jobs on their own," he said.

A Coal Board spokesman said that the miners' stratagem was causing an "embarrassing exodus." "If it keeps up," he said, "we may have to face the problem of holding enough men to keep the pits operating at all."

THE COAL TRADE

MOST areas report interest in the better qualities of household coal, indicating that a certain amount of restocking is getting under way. Otherwise trade is fairly quiet and merchants are finding little difficulty in meeting all orders promptly. Whereas the industrial demand remains fairly steady, a much bigger demand could easily be met and a stronger emphasis on replenishing stocks would be welcome. The home trade in coke is very quiet, but exports, particularly from the Tyne, have improved.

WEST MIDLANDS

A steady demand for house coal is being experienced and current production is sufficient to meet demand. A good market exists for best selected coals though pressure varies. Large coal and cobbles in the moderately priced groups are fully absorbed, yet some collieries are able to supply group 4 qualities for prompt delivery. House nuts, however, are a poor feature. The demand for anthracite coals is active with the strongest pressure for best stove nuts and beans, while supplies of the poorer descriptions are not difficult to obtain. Special purpose fuels are coming through in sufficient quantity to meet merchants' requirements, but coke is a dull feature.

The position in the industrial market is certainly better than a year ago. Supplies of all descriptions are adequate to meet general demand and re-stocking during the next few months will not present any problem.

Producers of hard coke are meeting increased difficulties in finding markets for some of their qualities, but not in the case of blast-furnace coke which is a strong feature. There is not a heavy demand for general purpose coke, while hard coke nuts are increasingly difficult to move. Foundrymen are in full-scale production and the consumption of foundry coke continues to grow, with production matching demand.

LEICESTERSHIRE

Production continues to be extremely good and there is a ready sale for almost all types of domestic coals. The lower groups in particular are in fair demand and supplies coming into depots are hardly sufficient to keep pace with orders. Supplies of best coal are far from plentiful and although there is more of some grades available than others, the very best grades remain extremely scarce. Orders are being placed forward for delivery as soon as these grades come to hand. For the time of the year the trade is reasonably active and is better than at the same period last year. There is a steady demand for all grades of anthracite including grains and beans and there have been some shortages developing in the latter qualities.

"Warmco" and "Cleanglow" continue to find favour and there is plenty of both qualities to satisfy the immediate demand. The only orders in the central heating market available at the present time are from public utilities and those private consumers who are beginning to stock to take advantage of the summer price concession.

Supplies in the industrial coal market continue to be reasonable for all qualities and the market remains reasonably active. The increase in industrial activity accounts for this and the trade is certainly in better condition than at the similar period last year. Despatches are prompt and all consumers are able to get the grade they require.

Success of Nylon in Pit Conveyor Belts

USE of nylon in conveyor belting or coal mines was mentioned by Mr. H. J. Ainsworth, home sales manager of the British Nylon Spinners, Limited, in an address at the first British Nylon Industrial Convention in London this week. He said that the industry used substantial quantities of phenol from coal to make nylon and that the National Coal Board bought belting containing the nylon. "This is almost becoming a virtuous instead of a vicious circle," he said.

The company has issued a statement on the rapidly increasing quantities of nylon now used in conveyor belting, much of it in British coal mines. Its introduction, says the statement, has been hastened by an NCB scheme designed to encourage manufacturers to develop new and tougher belts based on man-made fibres. It was significant that up to now the majority of new belts to be given "limited approval" under this scheme were belts containing nylon.

The first belts built from all-nylon fabrics are now beginning to go into action. They have tremendous strength and are ideal for high tensile working as well as being rotproof. Their introduction, the statement forecasts, may lead to the complete redesign of conveyor installation since they make possible the elimination of many transfer points.

Nylon is also used underground for trailing cables (in which it is used for tough, rotproof, flexible, braiding) and mine ventilation ducting. This ducting, made from tough but lightweight proofed nylon fabric, often weighs only half as much as ducting made from conventional materials. It is flexible and easily moved.

During the convention, textile manufacturers and representatives of user-industries visited an exhibition covering almost every aspect of nylon's industrial applications.

ARGENTINA PLANS FOR STEEL EXPANSION

PLANS are in hand to develop the ferrous metals industry of Argentina. The Zapla military works is increasing its output of pig-iron (to 120,000 metric tons), basic steel (to 130,000), and refined steel (to 20,000). In addition, the rolling mill at the Somisa plant in San Nicolas will in future handle about 1,500,000 tons annually. This plant is to be equipped with two new blast furnaces in the next two years.

Expansion is also planned at the Italian-owned Dalmine rolling mill, which has an annual capacity of 120,000 tons of tubes. To raise output to 300,000 tons, two 50-ton electro-furnaces and two 65-ton Siemens-Martin furnaces are to be installed.

Non-ferrous Metals

London Copper Market Lethargic

THE London copper market in its present mood seems insensitive to events which could be expected directly to influence prices. The quotation has remained more or less unmoved by the collapse of the Summit discussions and by the breakdown in the latest round of negotiations in the Chilean strike situation. In fact, no definite trend has yet emerged and is unlikely to until the Chilean strike situation is settled.

Until the position is settled one way or another consumer interest is apt to be negative. Meanwhile, stocks of refined copper in LME warehouses continue their recovery and at the end of last week totalled 3,918 tons, a rise of 429 tons on the week.

In the US custom smelters continue to find the market slow at 33 cents a pound, which price is also applicable to producers who are reported to be experiencing satisfactory demand. The current price of scrap is 24¼ cents a pound at which level offerings are on a limited scale.

The tin market is flat and featureless in London. the East and in New York where the price is still fractionally below $1 a pound. The market in all three centres is awaiting the outcome of the United Nations Tin Conference now in session in New York where the draft of a proposed new International Tin Agreement to come into effect on July 1, is being debated. In London, stocks at the end of last week totalled 8,179 tons, a fact which is reflected in the establishment of a contango—the first for over six months.

Lead continues to be a firm market in London and prices are holding up well at over £78 a ton. In the US demand is satisfactory and the price is unchanged at 12 cents a pound.

Zinc has turned quiet in London and remains so in the United States where steel production continues to decline. However, the position for both zinc and lead is being helped by labour troubles in US industries. The East St. Louis spot price is unchanged at 13 cents a pound.

Official metal prices in London yesterday (Thursday) were:—COPPER, Standard: Prompt £240 10s., forward £239 15s. TIN, Standard: Prompt £783 10s., forward £784. LEAD: Prompt £77 5s., forward £77 10s. ZINC: Prompt £90 15s., forward £91.

Export of Non-ferrous Metal Scraps

THE Board of Trade is prepared to consider applications to export 90 per cent. by weight of the usable metal content of imported non-ferrous metal scraps, wastes, and residues which, after importation, has been subject to processing such as sorting and cleaning, but not remelting in the UK.

A number of conditions apply and details may be obtained from the Industries and Manufactures Department, Division 4, Board of Trade, Horse Guards Avenue, Whitehall, S.W.1 (telephone: TRAfalgar 8855, ext. 7684) or in the case of aluminium, magnesium, and titanium scrap, wastes, and residues, to the Ministry of Aviation, Air A.2(LM), St. Giles Court, 1-13, St. Giles High Street, W.C.2 (telephone: MUSeum 3644, ext. 750).

Metallurgy Needs "A Little Empire-building"

MANY repetitive metallurgical operations are not jobs for metallurgists at all, said Mr. William E. Bardgett, new president of the Institution of Metallurgists, at its annual luncheon in London on Thursday of last week. Mr. Bardgett, who is research manager of the Rotherham research and development department of the United Steel Companies, Limited, declared: "These are the jobs we used to train young people to do and were content to leave them doing for years."

This, he said, was enough to break the heart of any junior aspiring to be a metallurgist. As a solution, Mr. Bardgett suggested that these repetitive jobs should be done by older people with no special training but with sufficient intelligence to learn the work quickly.

Mr. Bardgett spoke of the "inefficient utilization" of junior people's time as being out of keeping with the demands of industry for greater numbers of well-qualified and trained technologists. Each metallurgist, he went on, had a responsibility to his juniors to provide every possible facility for expanding their activities and experience in a planned arrangement.

"I feel sure we can all do a great deal more than we have done to enhance the status of our fellow metallurgists within our own immediate circle," he said. Many firms had well-organized training schemes but even in some of these, more could be done to provide metallurgists with wider experience in basic metallurgical work and up-to-date techniques.

"Apart from the question of providing larger numbers of trained and qualified metallurgists to meet the present and future demands, my general experience is that there is often a tendency to limit metallurgical effort in works laboratories to an undesirable low level. We have faith in the value of the contribution which metallurgical science can make and a little empire-building might, in certain cases, be justified," he declared.

Mr. Bardgett was elected president at the annual meeting which preceded the luncheon. From 1925 until 1933, he was with Colvilles, Limited, as supervisor of the heat treatment department for two years and as chief assistant metallurgist for the remainder of the time. In 1933, he became chief metallurgist in the central research department of the United Steel Companies, Limited, and since 1945 has been research manager of the company's research and development department. Mr. Bardgett was president of the Sheffield Metallurgical Association in 1941 and was awarded the Sir Robert Hatfield medal of the Iron and Steel Institute in 1953.

Other officers elected were:—President-elect, Dr. N. P. Allen, National Physical Laboratory. Vice-presidents, Mr. E. A. Bolton, metals division of Imperial Chemical Industries, Limited; Mr. E. G. West, Aluminium Development Association. Honorary treasurer, Mr. L. W. Derry, Battersea College of Technology. Council: Mr. I. Jenkins, General Electric Company, Limited; Mr. A. H. Sully, British Steel Castings Research Association; Prof. C. R. Tottle, University of Manchester; Mr. E. Mitchell, Lucas Group Research Centre, Birmingham.

ADDRESS OF Thos. C. Wild (Machinery), Limited, has changed to Vulcan Works, Langsett Road, Sheffield, 6 (telephone: Sheffield 343901).

Company News

SIMON GROUP MERGER

Shareholders Told of £18,000,000 Scheme

FULL details of the proposed merger of Henry Simon (Holdings), Limited, and Simon-Carves, Limited, the engineering companies, have been sent to shareholders. The merger will produce a new large group, Simon Engineering, Limited, with a share capital of nearly £5,000,000 and assets of about £18,000,000. Shareholders in the two existing companies will be offered shares in Simon Engineering, plus £2,750,000 in cash. All the capital of both Simon-Carves and Henry Simon will be owned by Simon Engineering, thus eliminating each company's holding in the other and releasing surplus cash.

Every public holder of one Henry Simon 5s. ordinary will receive 1½ new shares in Simon Engineering plus 5s. cash. Since Simon Engineering will pay a 26¾ per cent. dividend, Henry Simon's dividend is thus raised from 35 per cent. to 40 per cent. For public holders of Simon-Carves, the offer is one and a half new shares for every 5s. ordinary with 5s. cash and one 6 per cent. cumulative preference for every 15 shares. This recognizes Simon-Carves's greater contribution to the new group's assets.

The proportion of combined net assets attributable to Simon-Carves is about 53.4 per cent. and on the basis of earnings over the past three years, the share of profits is in the region of 52.5 per cent., and the scheme gives Simon-Carves shareholders a 52.3 per cent. stake in the equity of Simon Engineering.

Lord Simon as Chairman

If the scheme becomes effective, the issued capital of Simon Engineering will be £4,677,682 10s. Of the 6 per cent. preference capital of £922,407 there will be £573,469 attributable to preference holders of Henry Simon other than Simon-Carves and £348,938 attributable to former outside ordinary holders of Simon-Carves. It is indicated that consolidated trading profits of Simon Engineering for 1960 should not be less than the aggregate of those of the two companies for 1959.

Lord Simon of Wythenshawe, president of both companies, has consented to be president of Simon Engineering, but does not wish to be a director because of age. Initially the board of Simon Engineering will comprise: Mr. R. B. Potter, as chairman, and nine directors (each of whom is a director of either Henry Simon or Simon-Carves): Mr. D. T. Barritt, Mr. H. Clarke, Mr. I. Hey, Mr. N. Hinton, Mr. E. G. Liebert, Mr. C. G. H. Simon, Mr. G. H. Sugden, Mr. C. H. Wooll, and Mr. J. P. V. Woollam.

Simon Engineering will be a holding company and the businesses of both Henry Simon and Simon-Carves and their respective subsidiaries will continue to operate under their present names and managements.

Results for Henry Simon for 1959 show a group net profit for 1959 of £667,562 (£573,235) with a 35 (20) per cent. dividend and a special capital distribution of 10 (7½) per cent., paid in March. The chairman, Mr. I. Hey, says that turnover for 1959 was somewhat reduced, despite which the trading profit was slightly above the record figure in 1958. Orders in hand at the year end represented rather more than 15 months' work. The Simon-Carves group net profit for the year was £826,563 (£691,501).

LONDON ALUMINIUM COMPANY, LIMITED—Group net profit rose from £46,711 to £66,148 and a final dividend of 10 per cent. makes 12 (10) per cent. for 1959.

EDWARDS HIGH VACUUM, LIMITED—The chairman, Lord Wilmot, announced at Wednesday's meeting in London that the scrip issue would be on a one-for-two basis.

PRESSED STEEL COMPANY, LIMITED—Acceptances in respect of about 96½ per cent. have been received for the 7,151,013 5s. ordinary shares recently offered on provisional allotment.

BRITISH ROPES, LIMITED—Issue of 4,198,068 ordinary shares of 2s. 6d. is to be made to raise approximately £2,000,000. The shares will be offered to holders of May 2 at 9s. 6d. each by way of rights issue on a one-for-eight basis.

UNIVERSAL GRINDING WHEEL COMPANY, LIMITED—The interim on the ordinary capital is being raised to 7½ (5) per cent., tax free, and forecasts of a final of 12½ per cent. would make a total dividend of 20 (17½) per cent.

SHEFFIELD TWIST DRILL & STEEL COMPANY, LIMITED—Group net profits for 1959 rose from £206,336 to £240,845, after tax of £281,428 (£235,593), and the final dividend of 12½ per cent. makes 18¼ per cent. (same) for the year.

HEATRAE, LIMITED, manufacturers of electric and water heating appliances, of Norwich—Net profit increased from £15,156 to £24,759 in the year ended February 29, 1960, and the dividend is raised 2½ per cent. to 22½ per cent.

ARTHUR BALFOUR & COMPANY, LIMITED, manufacturers of high-grade steels, of Sheffield—A final dividend of 6½ (5½) per cent. makes 9 (8) per cent. for 1959. Group profits rose to £167,188 from £119,154, after tax of £122,795 (£54,589).

CRITTALL MANUFACTURING COMPANY, LIMITED, makers of metal windows, etc., of Braintree (Essex)—It is proposed to raise £750,000 by an issue of 1,500,000 5s. ordinary shares at 10s. each. The rights belong to holders of April 26 on a three-for-10 basis.

COPELAND & JENKINS (HOLDINGS), LIMITED, mica manufacturers and electrical element suppliers, of London, E.10—Profit for 1959 increased from £159,313

to £208,511, and the final dividend of 8 per cent. makes a total equivalent to 12 per cent. for the year.

STAVELEY COAL & IRON COMPANY, LIMITED—All the issued share capital of F. T. Wood & Sons, Limited, flour millers, of Harrogate, Woods (Birstwith), Limited, rusk manufacturers, and Lockyers (Sapitaw), Limited, rusk merchants, of Liverpool, has been acquired.

METAL INDUSTRIES, LIMITED—Terms of the forthcoming rights issue are one £1 ordinary share at 54s. for every £4 ordinary stock held on May 2. Of the total, 20s. a share will be payable on acceptance on or before June 17 and the balance on or before July 30.

HATTERSLEY (ORMSKIRK), LIMITED, engineers, iron and non-ferrous founders, of Ormskirk (Lancs)—Final dividend of 15 per cent. makes 20 (17½) per cent. for the year ended March 31, 1960. Group net profits rose from £289,740 to £357,141, after tax of £299,116 (£296,201).

BUTTERLEY COMPANY, LIMITED, ironmasters, iron-founders, etc., of Butterley, near Derby—A further capital distribution of 6d. per 2s. 6d. share is being paid for 1959, making 9d. per share, against 4d. for 1958. Group profit for the year is £103,427, against a loss of £683,796.

STONE-PLATT INDUSTRIES, LIMITED—Group profits for 1959 fell from £2,673,739 to £2,106,536, but the outlook for 1960 is encouraging and results for that year should show a definite improvement, it is stated. A final dividend of 11 per cent. maintains the total of 15 per cent. for the year.

HEAD, WRIGHTSON & COMPANY, LIMITED—Group trading surplus fell from £1.815,173 to £1,648,515 in the year to January 31, 1960, and the net profit was down from £874,654 to £803,758, after tax of £628,580 (£636,011). A final dividend of 10 per cent. makes 14 (13½) per cent. for the year.

PEGLERS, LIMITED, brassfounders, engineers, etc., of Doncaster—The dividend for the year ended March 31, 1960, is raised from the equivalent of 15 per cent. to 16⅔ per cent. on capital increased by a one-for-two scrip issue. Net profit rose from £257,688 to £344,350, after tax of £329,000 (£266,000).

MORGAN CROSSLEY & COMPANY, LIMITED, manufacturers of brake and clutch linings and asbestos products, etc., of Manchester—In face of the difficult conditions in the oil heating appliance industry with the consequent effects on the wick business, the interim dividend is reduced from 5 to 2½ per cent. for the year ending September 30, 1960.

UNIDARE, LIMITED—Net profit for the year ended March 31, 1960, was £140,783 (£120,768) and the dividend is raised to 12½ (10) per cent. In order to provide permanent instead of temporary working capital for continuing development and expansion, it is proposed to create and issue 500,000 7 per cent. redeemable cumulative £1 preference shares.

GLENFIELD & KENNEDY HOLDINGS, LIMITED, hydraulic engineers, of Kilmarnock—The group's outstanding orders which at the beginning of 1958 stood at about £9,000,000 and £7,000,000 a year later, had dropped to just under £6,000,000 by the beginning of 1960, says the chairman Mr. Hugh Cowan-Douglas. The value of new business booked so far this year is improved in comparison with the corresponding period of 1959. With industrial recovery now more evident in the capital goods sector, there is hope that the position will continue to improve during the rest of the year. There are, however, few signs yet of renewed large-scale activity by oil companies for expansion of refining capacity or placing of orders for new oil tankers.

Board Changes

E. V. INDUSTRIALS, LIMITED—Mr. B. H. Woodall has resigned from the board.

CEMENTATION COMPANY, LIMITED—Mr. F. G. Atherton has resigned as a director due to ill-health. He will continue to serve in a consultative capacity.

RALEIGH INDUSTRIES, LIMITED—Mr. C. Gilbert Smith has been appointed an executive director and has resigned from the board of Enfield Cycle Company, Limited.

WOLVERHAMPTON METAL COMPANY, LIMITED—Mr. F. W. James and Mr. K. R. H. James have been appointed joint managing directors with Mr. A. M. Anderson.

HARTLEY BAIRD, LIMITED—Mr. Duncan Wright has joined the board and been appointed joint managing director. Mr. H. J. D. Walmsley, has resigned as joint managing director.

PULSOMETER ENGINEERING, LIMITED—Sir Charles Key, until recently Deputy Under-Secretray of State, War Office, and Mr. H. T. Collinswood, have joined the board. Mr. N. Tetlow has resigned his directorship.

BROWN BROS. & COMPANY, LIMITED—Mr. W. M. Adam has been appointed commercial and financial director in succession to the late Mr. Alexander Mather. Mr. Adam was formerly a manager with Production-Engineering, Limited.

SISKOL MACHINES, LIMITED—Mr. Richard D. B. Clark, general manager, and Mr. P. S. Elliston have joined the board. Mr. Clark has been with the company many years and has been its general manager since 1951. Mr. Elliston is senior partner of W. H. Stentiford & Company, secretaries to the company.

IRON TRADES EMPLOYERS INSURANCE ASSOCIATION, LIMITED—Sir Charles Connell has been elected chairman of the company and of the subsidiary, the Iron Trades Mutual Insurance Company, Limited, in succession to Mr. F. C. Pyman who has resigned. Sir Greville S. Maginness remains vice-chairman of both companies.

David Brown Orders Climb Again

ORDERS received by the general engineering side of the David Brown Corporation, Limited, during the current financial year are over £2,000,000 in excess of those received at this period last year, says Mr. David Brown, chairman and managing director, in his annual review. He adds that the foundry division, which last year showed signs of a weakening order-book, is now more than fully occupied.

Whatever the outcome of the current year, which should be considerably more profitable, Mr. Brown continues, 1960 will be a notable year because it marks the company's centenary. "It is a far cry from my grandfather's original pattern shop serving a local market in the West Riding of Yorkshire to the present David Brown Organization known for its products and engineering techniques in every country of the world, and it will be our aim in the second century of our existence to develop and expand our business still further so as to make it truly international in scope," he says.

PARTY of 25 apprentices and senior officials from Bultfabriks AB, Sweden, visited the works of South Wales Switchgear, Limited, at Blackwood, on Monday. The apprentices paid the cost of the trip themselves.

Britain Should Join the Six—ECSC Chief

RAPID steps should be taken to draw Britain closer to the Six, said Mr. Dirk Spierenburg, senior vice-president of the High Authority of the European Coal and Steel Community, in an address to the European Movement at Zwolle, Netherlands, on Saturday. The goal should be full British membership of the Common Market, he said.

"Let the Six take a positive attitude," he declared. "They should not fall back on the same reserved and negative attitude which for so long marked British policy towards the Six. Let our British friends speedily have the courage and the vision to take the major step towards the European Economic Community."

Mr. Spierenburg said that Britain should regard negotiations with the Six not purely as an economic step. She should also recognize the political significance of integration, and particularly her role in binding Germany firmly to the West. Once Britain took this hurdle, the Six should not hesitate, he declared. "They should accept negotiation on British membership with a positive and constructive approach."

New Aluminium Venture by Scottish Company

TO increase Scottish capacity for producing aluminium ingots to customers' own specifications, a new undertaking, Charles W. Ireland (Aluminium), Limited, has been formed at Hamilton. The chairman is Mr. Duncan Ireland, of Charles W. Ireland & Son, Limited, the Hamilton firm of engineers and scrap metal merchants, which is to handle buying and sales, leaving the new concern to concentrate on technology and production.

The new refinery, now in production, is situated within the existing factory, and is working on substantial orders from England. The firm proposes to use scrap aluminium as its raw material. After rough sorting, the scrap is tested for quality in the laboratory, melted, and the necessary additives introduced to meet customers' specifications. Further quality tests are made during the refining process and a technical advisory service is also given to customers.

Automation Exhibition Opened by Lord Mills

IMPACT of scientific and technical development on Britain's industrial life was described by Lord Mills, the Paymaster-General, when he opened the International Instrument, Electronics, and Automation Exhibition, at Olympia, London, on Monday. Lord Mills said the impact might almost be called an explosive force.

"We look to the great industries of this country to benefit from the progress you are making to increase their efficiency in order that we might do the things we want to do and which we ought to do," he said. This year's exhibition is twice the size of its predecessors in floor space and in exhibitors, which number nearly 500, including 100 from abroad.

PRICES OF HOT broad band steel have been reduced by 4.4 per cent. by August Thyssen-Hütte, AG, of Western Germany. This follows a similar move by Klöckner-Werke, AG.

ICI Chairman Forecasts Continuing Progress

LONG-TERM prospect of Imperial Chemical Industries, Limited, was one of continued progress, said Mr. S. P. Chambers, in his first annual address as chairman. He said there had been great activity in practically all the company's products so far this year despite growing competition at home and abroad.

MR. S. P. CHAMBERS

The home trade outlook was also good, he said, adding that the revival of business in the capital goods industries might be partly offset by hesitancy in some branches of durable consumer goods. Exports last year expanded by 19 per cent., including 25 per cent. more to the Common Market, 41 per cent. more to the Free Trade Area, and nearly twice as much to Russia and Eastern Europe.

When the results for 1959 were compared with those of 1958, he said, the improvement in profits was striking, but by taking a longer view and comparing the growth of the company over the past 10 years, it would be seen that the 1959 profit bore no more than a reasonable relationship to the funds invested in the company. Although the profits had grown and were about two and a half times what they were in 1950, the total funds invested had increased similarly and stockholders were entitled to expect a fair return on all the money invested in the company, whether subscribed as share capital or kept within the company as undistributed profits.

Mr. Chambers said that the company's metal interests had been the subject of careful consideration with a view to improving profitability. In the case of aluminium, the directors came to the conclusion that a link-up with the Aluminium Company of America, would enable the business in this country to develop with the full benefit of the immense expenditure on research incurred year by year by ALCOA. "The formation of the new company, IMPALCO, has provided us with a good start; and further progress is being made to develop this valuable partnership," he added.

Foundry Apprentices Show their Skill

RESULTS of the European Foundry Apprentice Competition, which has been in progress this week, will be announced today (Friday) at a closing ceremony and dinner in Tallow Chandlers' Hall, London. Candidates from eight countries have been competing.

The written work has taken place at the National Foundry College, Wolverhampton, and the practical work at the Wednesbury foundry of F. H. Lloyd & Company, Limited. The judges were a panel of expert foundrymen from five of the represented countries under the chairmanship of Dr. J. G. Pearce, until recently director of the British Cast Iron Research Association.

Appointments

Dr. R. H. WAGNER has been appointed full-time Lecturer in Geology at Sheffield University.

Mr. G. SMITH has been appointed training officer of Old Roundwood Colliery (Yorks) in succession to Mr. D. S. Byrne.

Mr. P. J. WYLLIE is to be appointed Lecturer in Experimental Petrology in the Department of Geology, and honorary Lecturer in the Department of Inorganic and Structural Chemistry of the University of Leeds.

Mr. R. STARKEY, assistant manager of the burner division of George Bray & Company, Limited, heating engineers, of Leeds, has been appointed manager for the Midlands and north of England of Perl Controls, Limited, manufacturers of temperature controls, of London, S.W.6.

Mr. F. S. LLOYD has been appointed purchasing officer of BTR Industries, Limited, thermoplastics and rubber manufacturers, of London, S.W.1. He has been purchasing officer of the Crompton Parkinson, Limited, group for the past five years.

Formerly director and general manager of the Trafford Park Works of Lancashire Dynamo & Crypto, Limited, Mr. A. J. BEANLAND has been appointed general manager of the Radcliffe Works and a special director of Mather & Platt, Limited, electrical, textile, and hydraulic engineers, etc., of Manchester.

Mr. MAURICE S. HALL has been appointed assistant home sales manager of Bray Construction Equipment Company, Limited, of Feltham (Middx). Mr. Hall, who joined the company in 1957 as a senior area representative, was formerly in charge of contracts and sales with Dowty Hydraulic Units, Limited, Ashchurch (Glos).

TUC Urges Independent Body to Study Exports

INDEPENDENT committee to study Britain's whole export performance was suggested by the Trades Union Congress at a meeting of the National Production Advisory Council for Industry last Friday. Mr. Alan Birch, chairman of the TUC economic committee, made the suggestion in the discussion which followed an address by Mr. D. Heathcoat Amory, Chancellor of the Exchequer.

Mr. Birch put forward the TUC's view that there should be more positive controls over the economy and trade. Financial control alone was not the right way of achieving what the Government wanted and credit restrictions would not help in improving Britain's position in international markets.

The Chancellor replied that he was not dissatisfied with the way things were going. In the past two years or so, the price index had remained fairly stable—something he regarded as a considerable achievement—but if it was to remain that way more positive action would have to be taken by both sides in industry.

TWO FACTORIES, occupying more than seven acres on the Bromborough Port Industrial Estate, Merseyside, have been bought by Joseph Lucas (Industries), Limited, Birmingham, in readiness for the growth of the motor industry on Merseyside. The company is believed to have paid £200,000 for the factories, which were owned by Metal Industries, Limited, and have nearly 100,000 sq. ft. of floor space.

Natural Gas Effect on Pyrites Markets

ROOT cause of the oversupply of sulphur in Europe was the advent of the natural gas industry at Lacq, stated the chairman of the Tharsis Sulphur & Copper Company, Limited, Mr. W. P. Rutherford. Pyrites as a sulphur ore could not escape the repercussions of a situation where the USA and Mexican producers of elemental sulphur were fighting to hold their established position in the face of Lacq's determination to place its by-product sulphur.

Fortunately, Mr. Rutherford continued, pyrites after yielding its sulphur content left 70 per cent. of its weight as residues composed of a high-grade hematite iron ore after a treatment which also recovered the copper and other metal contents. Last year the company delivered 637,783 (568,044) tons of pyrites—an increase of about 12 per cent.

The Spanish market for pyrites was now one of the largest in Europe and was increasing. It was still subject to price control. The company had developed an additional source of revenue by the sale of calcined residues left by heap roasting of the ore in the last century. These were high in iron and low in phosphorus and, after sintering, gave a high class hematite ore for blast furnaces.

Cambridge to End Engineering Proficiency Certificate

FACULTY board of Cambridge University has urged the discontinuation of the Certificate of Proficiency in Engineering Studies and the associated examination in engineering studies, with effect from 1963. It has done so because the number of undergraduates at present entering the Engineering Department with the intention of reading for the certificate has become negligible.

The board states that the regulation for the certificate should be rescinded without hardship to any prospective candidate if Section I of the examination were to be held for the last time in September, 1962, and Section II in September, 1963. The Financial and General Board of the university offers no objection to the proposal.

STEEL PIONEER'S MEMORIAL SITE CONTROVERSY

DIFFERENCE of opinion has arisen at Blaenavon (Mon) over the site of an obelisk memorial to Sidney Gilchrist Thomas, who pioneered the process of basic steelmaking at the works of the old Blaenavon Iron & Steel Company. Newport and District Metallurgical Society, sponsor of the memorial fund, has been granted permission to erect the obelisk at the works of Daniel Doncaster & Sons, Limited, dropforgers, etc., whose premises now occupy the site of the old company.

But Blaenavon Council feels that this is too important a memorial to be tucked away inside the walls of a works on the outskirts of the town. The society is to be asked to reconsider its decision on the site.

NEWS IN BRIEF

ADDRESS of Royce Electric Furnaces, Limited, as from Wednesday will be Albert Drive, Sheerwater, Woking, Surrey (telephone: Woking 5401-4).

JUBILEE of Jackson Bros. (Milton), Limited, non-ferrous founders, of Stoke-on-Trent, was marked by a civic visit by the Lord Mayor on Wednesday.

AS FROM Monday the address of Cardox (Great Britain), Limited, will be City Wall House, 84-90, Chiswell Street, London, E.C.1 (telephone: MOOrgate 9691).

CHANGE OF NAME is announced by Niagara Screens (Great Britain), Limited. In future the company will be known as Niagara Screens & Plant, Limited. The address remains unchanged.

NEW NOTTINGHAM address of the Cambridge Instrument Company, Limited, London, S.W.1, is Century Insurance Building, Milton Street, Nottingham (telephone: Nottingham 42612).

TEAM of executives from Massey-Ferguson, Limited, led by the marketing director, Mr. L. H. Pomeroy, left on Tuesday for a 10-day helicopter tour of the company's distributors in the UK.

FINE PLATE UNIT, with a capacity of about 100,000 short tons, has been brought into operation in the three-year-old Inchon steelworks in South Korea to help satisfy home demand. Other plant is also being built at Inchon.

WHILE a 15-ton heat was being poured into a centrifugal casting machine at the foundry of Millspaugh, Limited, Sheffield, last week, molten metal burst through the front end and injured 10 men. One man was detained in hospital.

VOTING starts this week for the election of the new president of the National Union of Mineworkers. A second ballot by the country's 650,000 miners was made necessary by the death of Mr. Alwyn Machen, the winner of the first election.

FURTHER £112,000 development scheme is to be undertaken at the Leicester factory of the Metal Box Company, Limited, during the next year to 18 months. The factory has some of the most efficient production lines for open-type cans in Europe.

TWO MEMBERS of the girls' club of the Stanton Iron works Company, Limited—Sandra Jordan and Joyce Ford—went to Buckingham Palace last week to receive from the Duke of Edinburgh awards for having reached the gold standard in the Duke's awards scheme.

ENGINEERING FIRM of British M.A.R. Company, Limited, Grantham (Lincs), is to take over adjoining factory buildings and expand its works. Working in association with American and Austrian companies, the company will increase its range of products.

NATION-WIDE CAMPAIGN by the West German Metalworkers' Union for a 10 per cent. pay increase has been extended to Bavaria, where about 850,000 workers are affected. Similar claims have been lodged or already negotiated in all other parts of West Germany except the Saar.

PORTABLE CONVEYORS, fitted with vibratory screening equipment, produced by Frederick Parker, Limited, Leicester, are being used by the National Coal Board on stocking sites in Leicestershire and Derbyshire to speed up the screening of small coal and the loading of lorries.

ABOUT 450 members of the staff of Newton Chambers & Company, Limited, Thorncliffe, near Sheffield, were the guests of the managing director, Mr. P. J. C. Bovill, the Master Cutler, at a reception and dance at the Cutler's Hall, Sheffield, last Friday, to celebrate his year of office.

TWO EXECUTIVES of VOEST, the Austrian state iron and steel concern, have been to Moscow to discuss the Linz-Donawitz steelmaking process with the Scientific-Technical Commission of the Soviet Ministerial Council. The Russians are believed to be interested in adopting the process.

AN AGREEMENT has been concluded between Rubery Owen & Company, Limited, structural and manufacturing engineers, of Darlaston, Wednesbury (Staffs), and the unions for a 40-hour working week with no tea-breaks. The shorter week, which affects 6,000 workers, started on Saturday.

OUTPUT INCREASE of 50 per cent. was achieved last year by A/S Norsk Jernverk, the Norwegian state-owned iron and steelworks at Mo-i-Rana. Production rose from 174,000 metric tons to 262,000, and the company achieved its first-ever operating surplus. The company now exports to 40 countries.

HOPE that new light industries would be attracted to Tees-side was expressed by Mr. J. H. Patchett, director and general works superintendent of Dorman Long (Steel), Limited, at the 91st annual dinner of the Middlesbrough and District Foremen Engineers and Chief Draughtsmen's Association at Thornaby-on-Tees.

UNDER AN ARRANGEMENT with Smith & Grace (Sales), Limited, Clifton House, 83, Euston Road, London, N.W.1, improved stocks of Tecalemit mechanical lubrication equipment will be held in London and at various centres throughout the UK. The arrangement will also include improved technical representation including installation work.

MEMORIAL to George Stephenson, the railway pioneer, was dedicated by the Bishop of Derby, the Right Rev. Geoffrey Allen, at Holy Trinity Church, Chesterfield, on Sunday. The memorial was paid for out of funds collected by a committee which has been working on the project since the 1930s and takes the form of a communion table and altar furniture and fittings.

INTEREST in the development of the Hovercraft has been announced by William Denny & Bros., Limited, the Dumbarton shipbuilders and engineers. Mr. G. R. Denny, the office manager, said that the company was in negotiation with Hovercraft Developments, Limited, the subsidiary of the National Research Development Corporation which sponsored the development of the craft.

TO ACCOMMODATE increasing staff, Steels Engineering Installations, Limited, has constructed and occupied a new office block at Crown Works, Sunderland. The company, a member of the Steel & Company, Limited, group, has substantially increased its technical and commercial staff by the creation of a gas cleaning division and a pressure vessel and heat exchanger division.

ARRANGEMENTS HAVE BEEN completed by Francis Shaw & Company, Limited, of Manchester, for the manufacture of Shaw machinery and equipment in the Netherlands by Machinefabriek A. Fontijne, NV, of Schiedam. The machines will be marketed in the Benelux countries and Western Germany under the trade name Shaw-Fontine by Francis Shaw & Company, NV, The Hague. Shaw machinery will be manufactured in Italy by Maina SpA, of Asti, and marketed

under the trade name Shaw-Maina by Francis Shaw-Maina SpA, Turin.

AGREEMENT has been concluded between Matthew Wylie & Company, Limited, manufacturers of wood box nailing and printing machinery, of Glasgow, and John Fischer Abt. Maschinenbau Lohmar Bez., of Cologne, for the Fischer range of plastics extruding and blow-moulding machinery to be made in Scotland under the name Wylie-Fischer. The licence covers manufacture and the handling and sales in the UK and the Commonwealth.

NEW Glasgow offices and permanent showrooms of Turners Asbestos Cement Company, Limited, were opened on Thursday of last week by the chairman, Mr. Kenneth Neve. He announced plans, involving a capital outlay of £500,000, to extend the company's factory at Dalmuir. New building work and the installation of machinery and ancillary plant will make Scotland self-sufficient in a variety of items moulded in asbestos cement.

DEVELOPMENT SCHEME at the North Shields ship-repair yard of Smith's Dock Company, Limited, will cost £1,250,000 and preliminary tenders have been invited from selected contractors. The scheme envisages the scrapping of the outdated small dry dock and its replacement by a new dry dock with modern facilities, the lengthening and widening of another dry dock, the building of a new quay, and the erection of new shops for plumbers and boilermakers.

AFTER HEARING an application by the Federation of British Hand Tool Manufacturers and the National Federation of Engineers' Tool Manufacturers, a standing committee appointed by the President of the Board of Trade recommended on Tuesday that imported tools should be required to bear an indication of origin. This indication should be die stamped, etched, engraved, or moulded on the tool and the carton or container should also be suitably marked.

MINISTRY OF LABOUR announced yesterday (Thursday) that unemployment fell by 50,000 in the month to mid-May to a total of 341,000. This represents 1.5 per cent. of the labour force and compares with 2.2 per cent. a year ago. Unfilled vacancies have risen by 21,000 to 327,000—117,000 more than in 1959.

NEW DUTCH COMPANY has been founded jointly by R. W. Crabtree & Sons, Limited, manufacturers of printing machinery, of Leeds, and Mr. J. M. C. de Leur, of Holland. The new company, W. H. Howson (Continentaal), NV, is at Soest, near Utrecht, and will manufacture and trade in machinery and parts and requisites for the printing industry. Of the nominal capital of Fls. 1,000,000 in Fls. 1,000 shares, Crabtree holds 230 shares and Mr. de Leur, who will act as managing director, holds 25.

AUSTRALIA TABLES NEW TARIFF RATES

TARIFF changes affecting 15 industries were tabled in the Australian Parliament on Thursday of last week. Among them were protective duties for aluminium foil, which will start production in Australia soon. Duties of 10 per cent. b.p.t. and 17½ per cent., m.f.n., are being imposed on power hacksaw blades, previously admitted at concessional rates.

For alternating current induction-type motors, duties are extended to cover the higher horsepower ranges and duties on transformers and induction coils will also cover a wider range.

Orders Placed

CAPETOWN MUNICIPALITY has ordered over 20,000 type "44" water meters from the Measurement, Limited, division of Parkinson Cowan, Limited.

AUTOMOBILE gearbox division of the David Brown Corporation, Limited, has received an order for gearboxes, worth more than £40,000, from the Birmingham & Midland Omnibus Company, Limited.

INITIAL ORDER for four-cylinder 1.6-litre Perkins Four 99 diesel engines has been placed with Perkins Engines, Limited, Peterborough, by the Swedish combine harvester manufacturer, AB Westerasmaskiner. The order is worth £78,000.

THREE asphalt mixing plants worth £45,000 have been despatched by Frederick Parker, Limited, Leicester, to Asphalt Rah Iran. They will be used on the £2,000,000 project for making Abadan suitable as an international airport.

AS PART of the developments in the tinplate division of the Steel Company of Wales, Limited, a contract worth £2,000,000 has been awarded to Robert M. Douglas (Contractors), Limited, for civil engineering and building work at the Trostre Works, Llanelly, and Velindre Works, Swansea.

ORDER WORTH £15,500,000 has been placed with the English Electric Company, Limited, by the British Transport Commission as part of its programme for the modernization of the railways. English Electric is to build 190 main-line diesel locomotives at Preston, Newton-le-Willows, and Darlington.

AN ORDER, worth £670,000, has been placed with Hick, Hargreaves & Company, Limited, Bolton, by the Central Electricity Generating Board for two complete sets of condensing plant and auxiliary equipment for the extensions to the Tyneside Blyth "B" power station. The contract will be commissioned during 1964-65.

ORDER from the Hall Corporation of Canada, Limited, for a 25,000-ton cargo ship for the Great Lakes and St. Lawrence service, has been placed with the Fairfield Shipbuilding & Engineering Company, Limited, Govan. This is the third order, covering the construction of 11 ships, received by Fairfield in seven months.

TWO EXPORT ORDERS for wire ropes, which together will require 9,500 miles of wire, have been placed with Martin, Black & Company (Wire Ropes), Limited, Coatbridge (Lanarkshire). The first is for 70 miles of 1-in. galvanized wire rope for timber floating in Borneo and the second is for 21¼ miles of wire ropes ranging from 1¾-in. to 5¼-in. circumference for timber hauling in the Philippines.

REPEAT ORDER, worth £800, has been placed with William Boby & Company, Limited, water treatment engineers, of Rickmansworth (Herts) for a second demineralization unit for the Ipswich research laboratory of Fisons, Limited. The first unit was supplied by William Boby four years ago. The company has also received an order worth several thousand pounds from Courtaulds, Limited, for a pilot demineralization plant for Russia.

AS PART of a five-year plan to be undertaken by the Comision Federal de Electricidad in Mexico, Associated Electrical Industries, Limited, is to construct and equip a new power station at Ciudad Juarez. The contract is worth £3,250,000 and includes the design of the buildings, the civil engineering work, steam raising equipment, three 33 mW turbine generators, condensing gear, transformers, and switchgear. Apart from the boilers, which are to be built by Babcock & Wilcox, Limited, all parts will be built by AEI.

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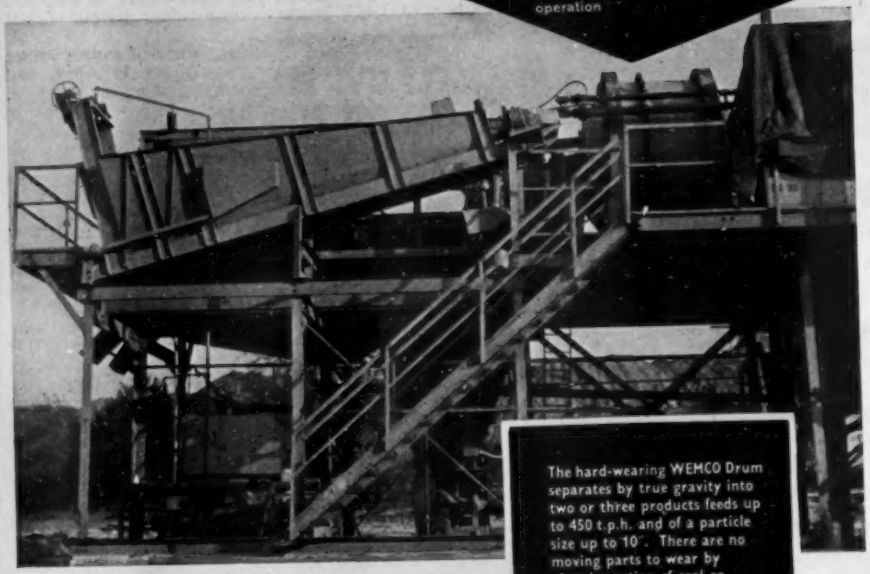

The hard-wearing WEMCO Drum separates by true gravity into two or three products feeds up to 450 t.p.h. and of a particle size up to 10". There are no moving parts to wear by abrasive action of coal or medium. Should the drum shut down fully loaded there is no jamming or abrasive problem on start up. The magnetite suspension is normally left in the drum between shifts.

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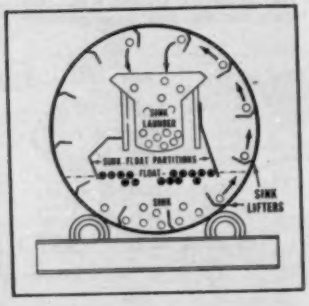

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Coal spirals
Froth flotation cells
Densifiers and thickeners

CL 23

Exports of British Coal

DETAILS of British coal exports and bunker coal shipments in April, and the totals for the first four months of this year and last, are given below.

	Month ended April 30.	Four months ended April 30.	
	1960.	1959.	1960.
Categories.	Tons.	Tons.	Tons.
Anthracite—			
Large	4,051	12,425	22,569
Graded	19,818	73,244	68,098
Cleaned smalls	13,706	39,334	71,725
All other	13,121	131,490	97,223
Steam coal (including household)—			
Unscreened	2,867	16,346	9,550
Large	47,512	68,083	263,894
Graded	31,566	95,476	168,257
Cleaned smalls	62,906	88,139	329,525
Untreated smalls	91,000	259,311	343,683
Other	15,886	87,754	70,292
Gas coal—			
Unscreened	14,932	51,605	79,133
Large	1,165	1,224	10,646
Graded	29,263	88,917	142,203
All other	77	2,989	11,858
Coking coal—			
Cleaned smalls	5,363	17,201	11,828
Other	5,684	40,697	36,228
TOTAL	358,917	1,074,235	1,736,712
Destinations.			
Canada	10,045	11,172	11,815
Other Commonwealth countries	4,513	4,842	12,787
Eire	101,955	249,346	448,194
Finland	—	3,560	14,580
Sweden	10,745	48,636	66,931
Norway	6,059	31,775	40,369
Denmark	82,710	267,704	487,376
Western Germany	42,792	87,526	149,445
Netherlands	65,663	135,775	273,828
Belgium	9,945	99,467	52,890
France	10,464	92,750	62,118
Switzerland	7,539	10,234	50,858
Portugal	4,022	3,275	42,984
Argentina	—	15,737	7
Other foreign countries	2,465	12,436	22,030
Fuel taken on board vessels engaged in the foreign trade (including fishing vessels) for their own use—			
British flag	37,316	208,107	144,472
Other flags	3,456	15,027	15,174

Exports of Coke and Patent Fuel

THE following table gives figures of exports of coke and manufactured fuel from the United Kingdom during April, and the totals for the first four months of this year and last.

Products.	Month ended April 30.	Four months ended April 30.	
	1960.	1959.	1960.
	Tons.	Tons.	Tons.
Gas coke	23,788	197,145	199,758
Hard coke	41,154	70,819	152,335
Breeze	32,262	151,442	130,877
Manufactured fuel	6,000	48,741	45,406
TOTAL	103,204	468,147	528,376

Imports and Exports of Mining Machinery

ACCORDING to Board of Trade returns, mining machinery (other than portable power tools) valued at £83,110 was imported during April, compared with £91,897 in April, 1959. Imports in the first four months of this year were valued at £429,926 against £355,453 in the corresponding period of last year.

The appended table contains figures of export values of mining and well-drilling machinery in April, and values for the first four months of this year and last.

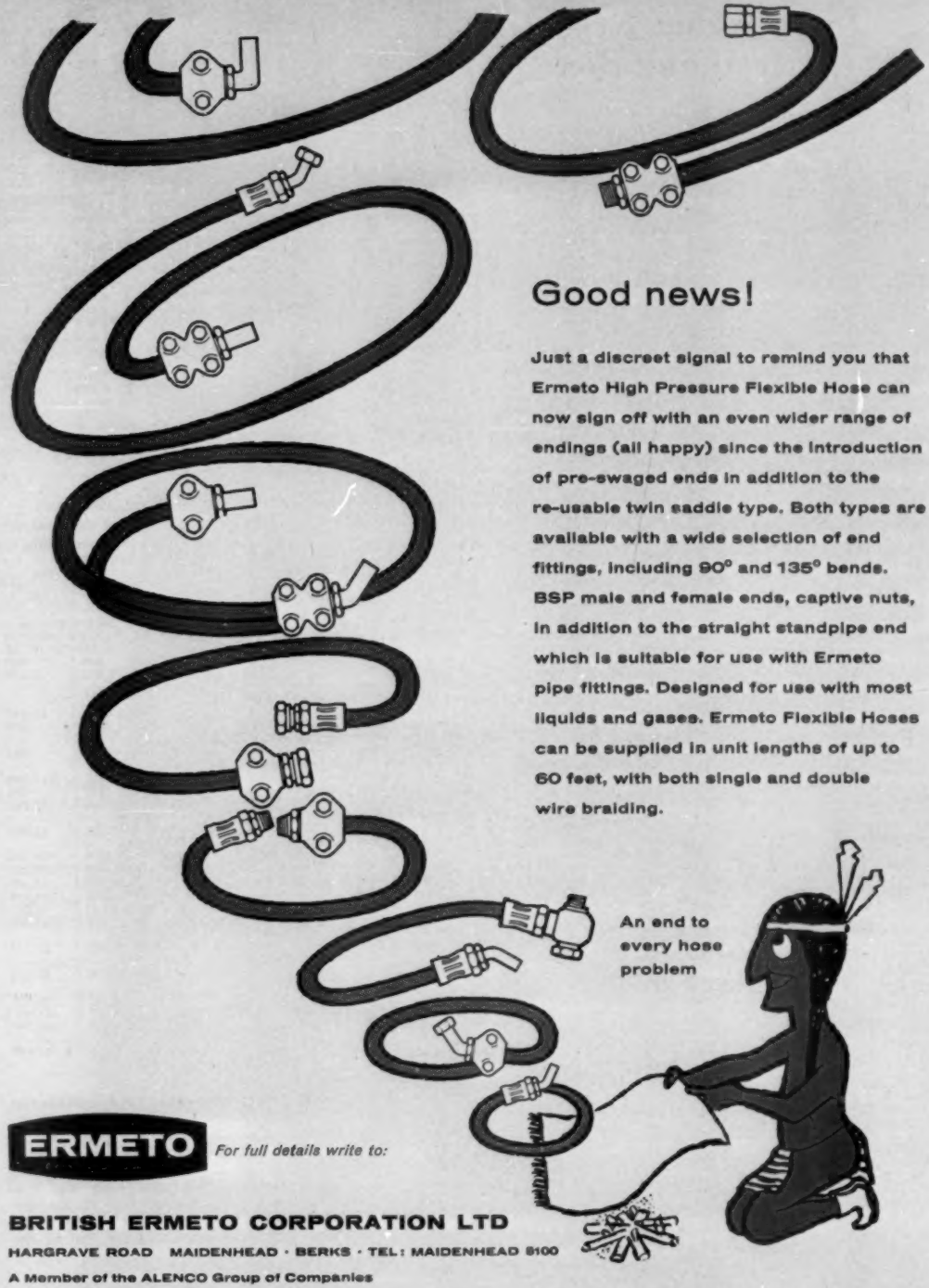
Destination.	Month ended April 30.	Four months ended April 30.	
	1960.	1959.	1960.
	£	£	£
Union of South Africa	15,316	210,672	240,372
Rhodesia and Nyasaland	6,298	61,104	17,243
India	136,436	588,553	434,951
Australia	39,631	97,876	129,358
Canada	32,656	72,800	150,869
Trinidad	30,394	101,972	103,921
Other Commonwealth countries and Eire	138,031	437,867	511,620
Netherlands	11,341	110,482	51,916
France	5,518	48,786	69,414
Venezuela	18,990	78,991	47,293
Other foreign countries	107,737	1,211,674	1,076,265
TOTALS			
Well-drilling machinery—			
Petroleum	170,603	1,177,382	976,007
Other	18,856	85,132	119,576
Mining machinery (excluding portable power tools)—			
Coal-cutters, power-operated—			
Complete	38,119	206,938	176,430
Parts	79,367	240,483	335,288
Conveyors, underground—			
Complete and parts	87,214	395,523	457,730
Winders, power operated—			
Complete	51,673	64,617	111,292
Parts	15,353	96,039	79,374
All other	81,163	754,663	577,525
TOTAL	542,348	3,020,777	2,833,222

Miners Complain of Stone in Concessionary Coal

MINERS at the Michael Colliery, East Wemyss (Fife), have been complaining about the amount of stone in their concessionary coal. A test case was taken up at the colliery by the local NUM branch and the men are to be compensated. Mr. M. Meharry, union delegate there, commented: "We took the case up because complaints were becoming so widespread." He said that an inspector who saw a sample delivered to a Kirkcaldy miner had to agree it was a particularly bad load.

Mr. Meharry went on: "I don't see why the ordinary consumer should not be able to adopt the same attitude. Anyone paying 7s. or 8s. for a cwt. should get a good cwt. I understand the retailer buying in bulk from the board is protected."

CHAIRMAN FOR THE coming season of the recently formed Midland Society for Quality Control is Mr. R. K. Grunau, of Rolls-Royce, Limited.



Good news!

Just a discreet signal to remind you that Ermeto High Pressure Flexible Hose can now sign off with an even wider range of endings (all happy) since the introduction of pre-swaged ends in addition to the re-usable twin saddle type. Both types are available with a wide selection of end fittings, including 90° and 135° bends. BSP male and female ends, captive nuts, in addition to the straight standpipe end which is suitable for use with Ermeto pipe fittings. Designed for use with most liquids and gases. Ermeto Flexible Hoses can be supplied in unit lengths of up to 60 feet, with both single and double wire braiding.

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Imports and Exports of Iron and Steel

FIGURES of imports and exports or iron and steel in April are given in the following tables, based on Board of Trade returns, and including totals for the first four months of 1959 and 1960.

Total Exports of Iron and Steel

Destination.	Month ended April 30.	Four months ended April 30.	
	1960.	1959.	1960.
	Tons.	Tons.	Tons.
Cyprus	154	532	580
Sierra Leone	634	2,028	1,879
Ghana	1,884	10,464	7,799
Nigeria	5,053	25,773	22,587
Union of South Africa	7,063	18,085	25,080
Rhodesia and Nyasaland	1,530	6,901	7,150
Tanganyika	567	7,083	2,951
Kenya	2,255	8,538	7,173
Uganda	127	2,466	548
Mauritius	242	503	1,425
Aden	175	853	637
Bahrein, Qatar, and Trucial States	1,129	3,321	6,078
Kuwait	583	5,183	1,978
India	19,031	55,973	89,905
Pakistan	5,957	12,694	25,578
Singapore	1,292	8,477	5,623
Malaya	2,038	4,186	6,662
Ceylon	1,913	15,975	16,895
British North Borneo	195	694	1,477
Hongkong	4,886	22,325	22,887
Australia	15,088	31,598	56,791
New Zealand	7,012	31,486	31,563
Canada	22,934	40,589	78,301
Jamaica	2,441	6,991	9,410
Trinidad	4,815	13,253	16,714
British Guiana	776	2,085	2,692
Other Commonwealth countries	3,811	13,707	13,461
Eire	4,865	15,290	20,562
Soviet Union	2,415	532	9,616
Finland	5,697	9,477	14,725
Sweden	15,152	41,055	72,154
Norway	9,356	31,773	45,010
Denmark	9,544	29,695	36,505
Western Germany	12,165	36,722	61,216
Netherlands	8,928	24,942	46,866
Belgium	2,296	9,494	12,537
France	456	849	2,701
Switzerland	1,163	2,847	4,259
Portugal	1,371	5,911	5,289
Spain	6,613	8,104	15,714
Italy	2,615	17,585	14,817
Austria	450	976	1,800
Yugoslavia	10,803	828	16,368
Greece	2,227	4,302	6,314
Turkey	670	1,768	1,646
Netherlands Antilles	217	981	1,775
Portuguese East Africa	481	550	1,557
Egypt	112	1,172	6,292
Sudan	1,003	3,385	4,031
Lebanon	122	112	476
Israel	1,151	3,092	7,805
Saudi Arabia	31	2,343	179
Iraq	970	37,546	8,665
Iran	1,639	10,728	27,647
Burma	417	1,882	2,949
Thailand	415	2,975	2,774
Indonesia	3,691	1,746	11,661
China	3,753	23,521	21,139
Japan	2,833	29,137	30,264
Philippine Republic	1,603	1,147	4,207
USA	16,940	37,241	104,299
Cuba	935	1,767	3,886
Colombia	556	651	3,266
Venezuela	6,429	31,045	18,339
Ecuador	298	430	898
Peru	621	882	2,523
Chile	253	659	904
Brazil	1,611	6,506	7,180
Uruguay	481	631	3,418
Argentina	11,597	67,693	38,299
Other foreign countries	10,449	15,575	46,880
TOTAL	278,979	877,310	1,213,236

Total Imports of Iron and Steel

From	Month ended April 30.	Four months ended April 30.	
	1960.	1959.	1960.
	Tons.	Tons.	Tons.
Union of South Africa	1,989	7,978	14,957
Rhodesia and Nyasaland	649	1,514	2,569
Canada	3,893	3,402	11,125
Other Commonwealth countries and Eire	819	3,830	10,545
Soviet Union	677	5,189	13,548
Sweden	3,660	8,628	15,452
Norway	13,203	26,567	46,630
Poland	1,791	974	8,411
Western Germany	14,187	16,544	57,989
Netherlands	23,881	55,870	68,381
Belgium	14,003	8,985	35,233
Luxembourg	2,021	2,007	4,962
France	9,055	6,417	24,154
Italy	4,291	839	8,318
Austria	1,165	1,023	4,483
Japan	801	728	2,768
USA	26,136	8,705	54,158
Other foreign countries	792	3,723	8,729
TOTAL	123,013	162,923	392,412
Iron and steel scrap and waste, fit only for the recovery of metal	14,877	866	56,719

Exports of Iron and Steel by Product

Product.	Month ended April 30.	Four months ended April 30.	
	1960.	1959.	1960.
	Tons.	Tons.	Tons.
Pig-iron	15,585	40,314	74,280
Ferro-columbium (niobium)	17	18	57
Ferro-tungsten	83	456	406
Other ferro-alloys	808	1,456	3,336
Ingots, blooms, billets, slabs, sheet bars (incl. tinplate bars), and similar primary forms	1,404	25,140	19,199
Pieces roughly shaped by forging	193	663	669
Iron bars, rods, angles, shapes, and sections	118	328	552
Steel bars, rods, angles, sections, and shapes	50,308	99,297	217,097
Iron plates and sheets	1	113	305
Universal plates	2,257	2,665	7,797
Steel plate, 3mm. and under 4.5mm. thickness	4,924	16,531	13,905
Ditto, 4.5mm. or more in thickness	25,929	50,316	118,706
Blacksheets and blackplate	25,350	85,604	108,248
Hoop and strip	8,317	24,213	33,837
Tinplate	51,899	155,677	199,484
Decorated tinplate	555	3,440	1,611
Galvanized sheets	9,835	31,111	28,084
Other (incl. tinned sheets, terneplate, and ternesheets)	2,497	5,692	11,345
Railway and tramway construction material	4,516	58,806	41,875
Wire rods of steel (incl. alloy steel)	4,705	13,450	21,313
Wire	10,332	32,300	42,967
Tubes, pipes, and fittings	59,346	229,720	268,163
TOTAL	278,979	877,310	1,213,236

Mr. JOSEPH O. EVANS, former chairman and managing director of Joseph Evans & Sons (Wolverhampton), Limited, pumpmakers, etc., has died at the age of 90. His great-grandfather founded the business in 1800 and he succeeded his father as chairman and managing director, a position he held until the firm was sold in 1944. Mr. Evans was a past president of the Birmingham, Wolverhampton, and Stafford District Engineering and Allied Employers' Association and of the Wolverhampton Chamber of Commerce.